COMPUTERWORK

Intranets trip over client/server apps

By Kim S. Nash

Looking for an application to convert to an intranet? Those old-time mainframe programs may be better candidates than newfangled client/ server systems.

Revamping client/server applications built with, say, Powersoft Corp.'s PowerBuilder or Microsoft Corp.'s Visual Basic is a lot tougher than making mainframe programs intranet-ready, several users and an-

Mainframes are getting a new lease on life as intranet servers. Although the client/server computing architecture isn't dead, it apparently doesn't fit well in the intranet world Intranets, page 127

Intranet obstacles

Users say client/server systems built in-house can be tough to convert to intranet applications for the following reasons:

- Too much application logic on the client
- Platform-specific coding not easily translated
- Client/server tools vendors lag in adding Web features to their products



In exclusive Computerworld columns, Republican challenger Bob Dole and President Clinton offer differing views on the hottest high-tech policy issues. See Viewpoint, page 33.

IS backing Dole, vendor vote split

By Gary H. Anthes and Mindy Blodgett

espite predictions of a landslide victory for President Clinton, the election is a lot less cut-and-dried for high-tech voters. While the vendor community seems split between Clinton and Republican challenger Bob Dole, a Computerworld poll of 100 information systems users shows Dole leading Clinton by 13 percentage points (see stories, pages 30 and 31).

Computerworld found that although Clinton is reaping praise for some initiatives, more recently he has angered high-tech vendors. This week, a group of at least 243 Silicon Valley executives plans to publish an open letter of sup-

However, a poll of 1,013 computer executives by H&M Consulting in Sunnyvale, Calif., found that 48% preferred Clinton and 39% hacked Dole

Clinton has won praise for decontrolling the export of some computers, supporting freetrade agreements and promoting use of information technology, particularly the Internet.

IS voters, page 30

Microsoft to hint at OS road map

By Laura DiDio and April Jacobs

Microsoft Corp. next week will turn up the heat on the Internet and its intranet offshoots by laying out plans to build distributed applications that integrate Windows NT desktops and servers with the Internet.

However, at its annual Professional Developers Conference in Long Beach, Calif., Microsoft will provide a limited road map for its two most important agendas: its Internet initiative, and migration and interoperability between its dual Windows 95 and Windows NT operating systems.

Microsoft has publicly stated that OS road map, page 127

Merger madness miffs users

By Bob Wallace

It's the internetworking industry's version of The Good, the Bad and the

Consolidation has angered some users, who say rampant acquisitions,

poor finan-Consolidation cials for

jor vendors and a loss of focus make it tougher for them to select - and stick with - the right vendors for long-term alliances.

For example, Cisco Systems, Inc. has made 14 acquisitions in three years, spending \$4.66 billion in just Merger madness, page 16

The Economy, the Deficit and Taxes

Clinton plan: Balance the budget by 2002. Exempt \$500,000 from capital gains tax on house sales. Ease rules on individual retirement accounts to allow early withdrawals in some cases. Boost grants to cities for job creation and increase education awards to needy/bright high school students.

Dole plan: Balance the budget by 2002 and support balanced budget amendment to the Constitution. Cut taxes for individuals 15%. Cut capital gains tax rate from 28% to 14%.

"There's a lot of skepticism about [Dole's] 15% tax cut. ... Most Americans realize you can't reduce the deficit by reducing income to the government.

- Arvid Larson, chairman of the research and development task force. American Association of Engineering Societies

"If Dole gets elected, I would just like to see the guy cut our corporate taxes and cut the capital gains rate and let us compete with the Japanese and Korean high-tech industries."

- T. J. Rodgers, CEO, Cypress Semiconductor Corp.

_ #8X88JFT# ##**#### CAR-RT SORT ** C035 © #48103UIU300SR003# JUL 96 001 011252

CUNIUERSITY MICROFILMS INT 9999

SERIAL PUBLICATIONS

S 300 N ZEEB RD ≥ANN ARBOR MI 48103-1500 17

Base: 100 IS professionals

CW poll results: Economy

The talk of '97

he network computer will be the computer technology story of 1997

My opinion was confirmed last week at Agenda '97, a gathering in Scottsdale, Ariz., of the industry's powerful and filthy rich. The titans of the PC industry were obsessed about a cheap desktop device that loads its data, operating system and applications across the network. And with good reason. This unassuming machine could fundamentally shift the value structure of the PC industry.

The network computer will draw powerful support from top

corporate management. IS departments and, yes, even a lot of end users. CEOs are alarmed at paying an annual \$8,000 to \$10,000 per employee to run software with features that aren't even used. IS departments see a chance to end the terminal upgrade cycle. And I'm convinced that many end users would immn at the chance to have a PC that doesn't crash. catch viruses or occasionally lose data.

The PC industry is worried, and that's just great. Because if the network computer does nothing more than get ven-

dors to take cost of ownership seriously, it will have fulfilled its purpose. Bill Gates is talking about "zero-admin clients." Intel wants to put chips in your PC that make it easier to manage. Internet-based software distribution is becoming a reality.

I still believe the network computer will fail. It's been badly positioned as a hobbled PC, and the cost-of-ownership advantages have been undersold. Unanswered questions remain about operating systems and Microsoft's lack of support. But that's no matter for now. In a poll at Agenda, nearly half the attendees said they believe the device will be commercially successful. That's a powerful message from a PC audience. And it may prod the industry to finally address that nagging cost-of-ownership issue.

Paul Gillin, Editor Internet: paul_gillin@cw.com

The 5th Wave by Rich Tennant



'Of course it was a tragic mistake, Mr. Hamlin. Someone inadvertently left the Mr. Potato Head. same running on the operating-room monitor."

Dueling SNA schemes set

By Laura DiDio

The Novell/IBM team and Microsoft Corp. are set to introduce rival SNA software that makes it easier for large organizations to access mainframe data from their

Analysts and users said SNA gateway software from Microsoft Corp. and from a joint Novell, Inc./IBM initiative will provide users with enhanced features.

Simpleraccess

"Both the Novell/IBM NetWare for SAA 2.2 and Microsoft's SNA Server 3.0 simplify and solidify access methods between legacy IBM SNA mainframe and AS/400 hosts and their LANs," said Lucin-

da Santisario-Borovick, an analyst at International Data Corp. in Framingham, Mass

NetWare for SAA Version 2.2. slated to ship by year's end, will offer several key enhancements, including support for 32-bit

LAN/mainframe

access

application programming interfaces for Windows 95 and Windows NT and native sup-

port for Novell Directory Services (NDS) in NetWare 4.11. That means users won't have to run NetWare 3.1 bindery emulation to access information in NDS directory trees.

Microsoft will ship its rival SNA Server 3.0 software early next month, said Vesa Suomolainen,

general manager of Microsoft's SNA Server product unit.

The first major upgrade of SNA Server in more than a year supports 5,000 concurrent user sessions and 15,000 host sessions, up from 2.000 user sessions and 10,000 host ses-

sions

The upgrade also includes a new data-encryption fa-

cility, a single-user sign-on to AS/400s and mainframes that eliminates multiple passwords and a service that allows PCs without SNA client software to access "shared folders" files on AS/400s.

Neither Novell nor Microsoft would disclose pricing.

News Shorts

AT&T president named

AT&T Corp. last week named John R. Walter, head of R. R. Donnelley & Sons Publishing Corp., as the company's president and chief operating officer. Un-

the AT&T succession plan,

Walter, 49, will solit the role of AT&T chairman and CEO with Robert Allen, 61, beginning in January 1998. He is expected to take full charge of the telecommunications giant later that year. Walter replaces Alex Mandl, who left AT&T in August to head a small wireless communications start-up. Walter's hiring comes just as AT&T is struggling to fend off competition, sort out its reorganization and plan a strategy for entering the local market.

Informix plays catch-up Informix Software, Inc. has announced data replication and distributed database management tools to compete with rival Oracle Corp. Informix officials said the company's Enterprise Command Center for managing multiple databases from a central console answers Oracle's Enterprise Manager released last summer. Informix plans to link its offering with third-party tools that can manage competing databases from Oracle, Sybase and IBM.

Visual Age family grows IBM is releasing Visual Age for Basic this week at the Software

Development '96 East conference. The latest edition to IBM's Visual Age family was designed to enable developers to visually script programs that cross both platform and language boundaries using the Basic programming language. Visual Age for Basic will be available from IBM's software site on the World Wide Web at www.software.ibm.com. The Visual Age family is an objectoriented development approach with major offerings for Smalltalk, C++ and Cobol. Visual Age for Java is expected by the end of the

Oracle enhancements

Oracle plans to introduce a trio of offerings that combine an enhanced version of its Workgroup Server database with its Web-Server software and a variety of tools, industry sources said. The Workgroup Server release borrows code from the Oracle7.3 enterprise server to support parallel query processing and bit-mapped indexes, the sources said. The bundles initially support Windows NT and may be introduced at next week's Oracle OpenWorld conference.

Borland loses \$9.8M

Borland International, Inc. last week reported a net loss of \$9.8 million, or 31 cents per share, for its fiscal second quarter ended Sept. 30. The figures match preliminary results the company announced last month. Revenue totaled \$36.4 million, compared

with \$51.3 million during the same quarter last year. Borland officials said revenue declined because the company hasn't changed its sales, marketing and development efforts fast enough to satisfy corporations developing client/server, Internet and intra-

Compaq plans handheld

Compaq Computer Corp. in Houston has jumped on the bandwagon for Microsoft Corp.'s new operating system for handheld devices, Windows CE. Compag recently announced plans for a handheld device that will run on the Windows CE platform and work with other Windows-based desktops and laptops. The pocket-size device will provide users with Personal Information Management capabilities, electronic mail, word processing and spreadsheet applications and an Internet browser. The device, which will cost between \$500 and \$1,000, will be available later this

BMC on NT bandwagon

BMC Software, Inc. in Houston this week plans to update Net-Tune Pro, its popular software for tuning network server performance, to handle Windows NT servers. With Version 3.0, Net-Tune Pro users can automate performance analysis of Windows NT and Novell, Inc. NetWare servers while adjusting network service to end users' needs. Pricing starts at \$895.

No Other Software Delivery Solution Delivers All Of This.

Unlike all of the piecemeal approaches to software delivery, there's one end-to-end solution that gives you everything you need.

Introducing CA-QuickD™ from

Computer Associates. It's the industry's most comprehensive, efficient and reliable software delivery solution. It's also the

easiest, fastest and safest way to package, distribute and install both

Comprehensive.

system-level and application-level software on both clients and servers across the enter-prise. Whether you're distributing a simple upgrade to a hundred users in a single location or a complicated.

Multi-Platform.

stations and servers around the world.

multi-tiered roll-out to thousands of work-

Multi-Platform

Multi-Protocol

Push and Pull Distributions

Event Monitoring and
Automation

Multi-tiered Distribution

License Management

Remote Access

Automatic Inventory Discovery

Install Builder

Centralized Event
Management Console

Integrated

QuickD makes sure your software is always installed accurately, error-free and fully synchronized. And you'll love all of QuickD's advanced

features such as: fan-out/multi-hop, unattended operations, parallel distribution and multi-tiered distribution capabilities. There's also multi-platform, **Automated**

multi-protocol support and simple, hassle-free license management.

Error-Free.

QuickD is the most advanced, comprehensive and powerful software distribution solution in the industry.

Scalable.

QuickD also integrates seamlessly with the standard for enterprise management: CA-Unicenter®

For More Information On CA-QuickD, Call 1-800-225-5224 Or Visit Us At www.cai.com

Call today to learn more about the industry's most trusted and popular software delivery solution.

Introducing CA-QuickD

1996 Computer Associates International, Inc., Islandia, NY 11788-7000. All other product names referenced herein am trademarks all their respective companies.

A PUBLICATION OF IN This Issue

News

NEWS

6 Access problem

PSInet sold 100,000 customers to a competitor; users say the new service stinks.

8 Temp or employee? Microsoft ruling puts every company that uses contractors in the hot seat.

Networkers wanted Networking skills are in high demand, pushing up salaries and recruitment.

OPINION

32 IS regulation

Users should beware of legislation that equates downloading software with signing contracts. Allan Alter warns.

IBM/Lotus surprise Notes: Users like the product, hate IBM's service, David Moschella says.

129 Keeping up with Microsoft The relaunch of The Microsoft Network raises the bar for Internet services, David Coursey says.

Technical Sections

SERVERS & PCS

Performance question

SMP will make performance clustering unnecessary for a while, analysts say.

SOFTWARE

Coffee conundrum

Java isn't ready for prime time, but corporations are using it anyway.

46 Shaky structures

Most companies' mix of applications is so complex, one wrong move could cause a meltdown

THE ENTERPRISE NETWORK

Get back to basics

LAN vendors shoot for WAN, but users want them to stick to their knitting.

Alternative to ISDN High-speed and cable modems are ready to flood the market with bandwidth.

THE INTERNET

61 Netscape pricing

Per-user or per-server, Netscape prices are more complex, higher for some.

Web weaknesses

Businesses flock to the Web, but critics say most sites are ineffective.

CORPORATE STRATEGIES

Resorting to efficiency

Premiere Resorts revamps IS to crossmarket its many properties.

Features

Intranets: Piggybacking intranet costs on other projects can spread the expense and reinforce the infrastructure. Follows page 100.

MANAGING

74 Introverts as leaders

Most IS people are introverts, but that doesn't mean they can't be leaders.

98 Ergonaut

An office warrior reviews latest products.

Top tool

Visual Basic promises to be the runaway top development tool for 1997.

MARKETPI ACE

Token Ring sites move to switching technology to revitalize their networks.

Etc.	
Company index	125
Editorial/Letters	32
F.Y.I.	74, 75
How to contact CW	125
Inside Lines	130

Dog HTML

O'Reilly's Website Professional 1.0

Buyer's Guide Web server shakeup

Web server review places small developer O'Reilly & Associates first, Microsoft second and Netscape third.

Page 85

Digital backs Tivoli, hands off NetView

TransQuest's John Ca-

hill: The firm is trying

to build a central view

of all systems and net-

work components'

By Patrick Dryden

Tivoli Systems, Inc. this week plans to announce an agreement under which it will acquire Digital Equipment Corp.'s NetView development group, and Digital will resell Tivoli's management products.

Also scheduled to be announced this week at the Tivoli Partners

Conference in Austin, Texas, are details about a scaled-down version of the Tivoli Management Environment (TME 10) designed to manage applications on small networks.

Administrators said new products and partnerships will bring them closer to the day when they can control distributed business functions without having to link separate tools.

Besides reselling TME 10. Digital will transfer to IBM-owned Tivoli the engineers and technology it has developed in its effort to create a Windows NT version of IBM's NetView network manager.

NT support

The technology and extra staff will help Tivoli strengthen its efforts to provide more support for Windows NT in its products and improve Net-View, both as an independent product and as a component of the TME 10 suite, said Frank Moss, president of Tivoli

The move gets Digital out of the management software business and lets it act as an independent service provider, supporting whatever platform is best for a particular customer, said Paul Mason, an analyst at International Data Corp. in Framingham, Mass.

International, Inc. recently acquired Polycenter. AssetWorks and other tools from Digital.

"Everything but the NetView piece went to CA, so this makes sense all around," Mason explained.

For Tivoli user Charles Schwab & Co. in San Francisco, the move

> marks a step toward the promised integration of network and systems management functions, said Richard Weiss, an architect for enterprise management systems at the company.

But users said Tivoli must complete this integration and prove such benefits before users can consider switching to TME 10 NetView from their chosen network management platform.

"We don't want to feel forced into adopting anything," said John Cahill, assistant vice president of production services at TransQuest. Inc., the Delta Airlines information services subsidiary in Atlanta.

Cahill and other Tivoli users in large organizations said they chose TME 10 because it can work with whatever network and systems management tools they prefer.

Smaller businesses should be able to apply a scaled-down version of the TME 10 suite early next year that eases management of specific applications, Moss said.

Tivoli will put a simpler interface on a set of tools for administrators responsible for fewer than 1,000 desktops and a few dozen servers,

The model is a kit that costs less than \$6,000 and helps distribute and maintain PowerBuilder applications for Powersoft Corp.

COME VISIT OUR WEB SITE

Visual developments

Visual Basic skills are among the hottest sought by IS managers. Preview an excerpt from our upcoming annual Skills Survey.

Emmerce

Version 2.0 of our Webzine looks at how the Web can lower PC costs and new options for buying software online.

rw.computerworld.com/emmerce

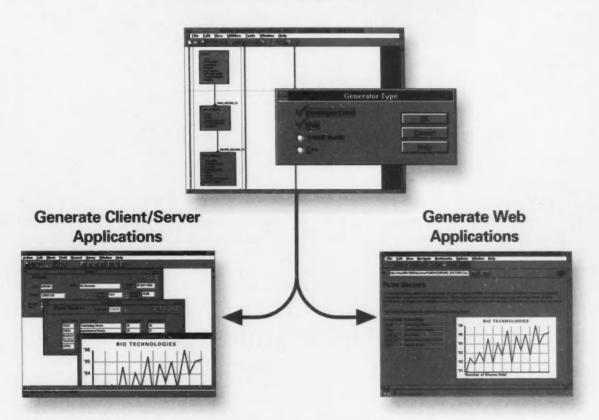
It's time for "Name That Server"

See our review of Web server software, then join author Ted Vegvari in an online forum.

www.computerworld.com/forums/

Generate Web and Client/Server Applications

Oracle Designer/2000



Designer/2000™ enables you to define your application visually rather than writing thousands of lines of procedural code. Then, at the touch of a button, you can generate either a Web or a client/server application — or both. So you don't have to choose between supporting your existing client/server users or moving ahead to the Web. No other toolset can do this.

For more information, call Oracle 1-800-633-1071, ext. 10116, or find us on the Web at http://www.oracle.com



REGISTER NOW.

www.oracle.com/openworld

ORACLE OPENWORLD USER AND DEVELOPER CONFERENCE . NOVEMBER 3-8 . SAN FRANCISCO, CA . 800.304.4664

© 1996 Oracle Corporation. All rights reserved. Oracle is a registered trademark, and Oracle Designest/2000 and Enabling the Information Age are trademarks of Oracle Corporation. All other company and product names are the trademarks of their respective owners.

Oracle leaves users behind the '8' ball

By Craig Stedman

Users expecting next week's Oracle OpenWorld conference to clear up some of the mystery surrounding the long-promised Oracle8 database should prepare to don their sleuth hats.

Oracle Corp. promised two months ago to divulge more details about Oracle8 at the San Francisco event, which combines separate conferences for users and developers.

But the company has changed gears and plans to keep Oracle8 mostly in the background, officials said. Oracle instead will push its network computer and network infrastructure into the limelight.

Several "sneak peek" presentations on Oracle8 are scheduled to take place at Oracle OpenWorld. But the company doesn't plan to

And still counting

Oracle expects up to 15,000 people to attend Oracle OpenWorld, including users, developers and exhibitors, said Zach Nelson, the company's vice president of marketing. As of last week, about 8,000 attendees had registered for the conference, he added.



Rich Malone, CIO at Edward D. Jones, wants Oracle8 for data warehouse subbort

highlight the upcoming database in any focused way, an Oracle spokesman said.

Sometime next year

That leaves users still wondering just when Oracle8 will become available. Oracle began limited beta testing of the next version of its database last summer, but, thus far, it has said only that the final release will ship at some point next year.

That doesn't pin things down nearly enough, said several users who are trying to track the development of Oracle8.

The whereabouts of Oracle8 "is on my list of questions" for Oracle, said Rich Malone, chief information officer at Edward D. Jones & Co. in St. Louis. "I've asked them that before, but they've been reluctant to give dates, at least firm ones."

Edward D. Jones, a brokerage firm, is developing a series of Oracle-based applications for a new client/server network that is being installed at its headquarters and 3,400 branch offices. Malone said he is counting on Oracle8 to provide faster performance and improved support for data ware-housing.

The biggest change coming with Oracle8 is support for blending relational and object technologies so the database can manage complex forms of data such as images, text, audio and video.

That kind of multimedia capability will be crucial for future Internet-based applications aimed at attracting prospective customers, said Hugh Allan, database manager at Dunlop Tire Co. in Amherst, N.Y. For example, Dunlop could allow its customers to view and manipulate images of tires before making a purchase, he said.

But the hybrid database approach has potential performance drawbacks that Oracle needs to address, Allan added. "I'm just not sure that object and relational technology are a real good mix," he said. "And we really don't hear too much about Oracle8 at this

Oracle this year announced a Universal Server package that includes its relational database plus separate servers for video and

other data types.

But that still can cause "data

and content management headaches" for users because the engines aren't integrated the way they will be in Oracle8, said Donald A. DePalma, an analyst at Forrester Research, Inc. in Cambridge. Mass.

User groups kiss and make up

ow many conferences can Oracle users stomach in a year?

That answer will come next week at Oracle Open-World. It is the first to take place since Oracle and its national user group settled a nasty dispute by agreeing to run separate shows in the fall and spring.

Each organization will participate in the other's event.

The International Oracle Users Group-Americas (IOUG-A) put together the technical sessions program for Oracle OpenWorld.

Oracle will exhibit and deliver a keynote speech and some presentations at the IOUG-A's conference in Dallas next spring

But Oracle controls the

agenda for Oracle OpenWorld and is making it "more Oraclemyopic" and marketing-driven than the IOUG-A's conference, said Michael Corey, a director of the user group and head of its conferences operation.

Left open for now is whether the IOUG-A will again handle the technical sessions for next year's Oracle OpenWorld. The two sides are interested in continuing the mutual backacratching, "but that hasn't been put into writing yet," Cover said.

Zach Nelson, vice president of marketing at Oracle, said the company hopes to keep the IOUG-A involved in the company-run conference. "I'm 100% confident that we'll find a way to do it again," he said.

- Craig Stedman

'net provider buyout undermines service

By Mitch Wagner

An Internet service provider has made a bold play to go straight from the minor leagues to the World Series. But disgruntled users may just send MindSpring Enterprises, Inc. back to the showers.

The Atlanta company signed an unusual contract this summer to buy about 100,000 dial-up customers from PSInet, Inc. in Herndon, Va., which will help catapult Mind-Spring's subscriber base from 49,000 in June to 135,000 by year's end.

But thousands of users, who either have to go with MindSpring or switch to a different service provider, are finding the switch from PSInet to MindSpring rough going. Electronic mail is getting lost or delayed, sometimes for up to weeks at a time. And MindSpring's technical support staff hasn't been helpful, users said.

"They're just saying, We're sorry, we're sorry, we're sorry, we're sorry. That's what the Menendez brothers said," said Larry Hertzog, a television producer in Los Angeles and a MindSpring user.

"The whole idea of not getting E-mail is horrific,"

said user Mike Freeman, president of CASE Technology Consulting,

Inc. "It's difficult to stay in touch with your customers and your associates [otherwise]."

Users who are experiencing problems appear to be mostly consumers and small businesses. But dial-up Internet access is also an issue for businesses that use dial-up accounts to support mobile workers, telecommuters and traditional office workers who log in from home on evenings or weekends.

MindSpring blamed PSInet for many of the delays, saying PSInet failed to provide sufficient technical support for the transition. But PSInet said it wasn't involved in MindSpring's customer support. "[The] general issue of customer support/administration rests squarely in the hands of Mind-Spring," said Brian

Internet service
providers

Muys, a spokesman for PSInet.
MindSpring one.

MindSpring specializes in dial-up accounts and World Wide Web site hosting, with customers split

site hosting, with customers split about half-and-half between consumer and business accounts. Some of its large corporate customers include The Coca-Cola Co., Turner Broadcasting System, Inc. and Lockheed Martin Corp.

Among the companies affected by the transition was Computerworld, Inc., which used PSInet and now uses MindSpring — for some of its dial-up Internet MindSpring is only the most visible example of growing user unrest with the declining quality of customer support available for Internet service. For instance, customers of Netcom On-Line Communication Services, Inc. are complaining of delays of up to two weeks in getting responses to their requests for technical support. And they said they are spending up to an hour on hold.

Netcom acknowledged the problems and said the company is staffing up and investing in additional help desk automation to speed up responses to requests for technical support.

"We are aware that delays are longer than we like, and we are taking steps to address the delays," said Eric Goffney, vice president of customer support.

Critics say many Web sites don't lure new business. See page 61.



Internet and online service providers left users tied up in knots this year:

BBN PLANET:

400 business users were left without Internet service for a day because of a power outage in Stanford, Calif.

AMERICA ON INT.

6 million users lost service for a day because of router configuration problems.

NETCOM ON-LINE
COMMUNICATION SERVICES:
400,000 customers

nationwide were left without service for 13½ hours when a programmer error in a router table crashed the network.



A lot of software vendors are charging into the market with Year 2000 "solutions," but look closely—you'll find many are proprietary, incomplete, or make claims you know are too good to be true. With our experience, we know better. Micro Focus Revolve/2000, gives you tangible, comprehensive technology in a

Revolve/2000 can work with other Micro Focus tools to provide seamless access to host files from the PC.

single package that lowers your risk and addresses every step in the process.

First, Revolve/2000's Assessment and Analysis facilities help you quickly identify every date occurrence in your applications and automatically locate the source code that needs modification. You'll see precisely which parts need to be changed and get an estimate of the cost and effort required to do it. That way, you'll be in a better position to decide what internal or external resources are needed to get the job done.

Next, its Implementation facilities let you either automatically convert two-digit date fields to four-digit fields or efficiently make source code modifications with its integrated editor. Then use Revolve/2000's built-in syntax checker to find errors and help ensure clean compiles before testing, either on the mainframe or, more cost-effectively, on a PC with other Micro Focus application development tools.

Nobody else offers anything like Revolve/2000. That's because we're the 20-year leader in tools and services for developing and maintaining legacy systems. We know how to help you avoid stepping in someone else's mistakes.

See For Yourself. Call Micro Focus and order your Revolve/2000 demo disk today. You'll see why it's the only solution you need.
Dial 1-800-632-6265 or visit us at http://www.microfocus.com.

1996 Micro Encus Ltd. Micro Focus is a registered trademark

Sun client undercuts PC costs

By Sharon Gaudin and Frank Hayes

By charging roughly \$800 for an entry-level machine, Sun Microsystems, Inc. is positioning its network computer as a cheaperto-buy-and-run alternative to traditional PCs.

Sun will officially unveil its Java Station tomorrow in New York,

flanked by a dozen major corporate customers and software vendors.

Sun hasn't yet released official specifications for its network computer, but *Computer*world has learned that it will cost between \$800 and \$1,500, depending on the hardware package.

The machine is expected to be powered by a Sun SPARC chip. It will have 8M bytes of RAM, run the Java operating system — the Java Virtual Machine — and use Sun's Hot Java as a World Wide Web browser.

Java Station is almost as deep as a typical PC but only about 40% as wide, according to Evan Quinn, an analyst at International Data Corp. in Framingham, Mass.

Java Station targets terminalstyle applications. "Their initial market thrust is heads-down envi-

Network

computers

ronments — customer inquiry, phone ordertaking, classic data," Quinn said. "Their goal is to have no mov-

ing parts initially. They want companies to keep two or three spares in a closet. When one [network computer] fails, take it out, and send it back to the vendor. They plug in another, and they're back in business."

Unlike PCs, network computers — or thin clients — download

software across a network when needed. This can make applications much easier and less expensive to manage.

Joining the crowd

Sun is the third major vendor to enter the network computer market in recent months. IBM in September introduced its Network Station, a \$700 machine for business users. Oracle Corp., one of the more fervent supporters of network computers, is also developing a network computer that is expected to debut in a few months.

"Supporting PCs is getting very expensive," said Larry Hagerty, a senior systems analyst at Tampa, Fla-based GTE Data Services, a subsidiary of GTE Corp. "Sun's network computer would be a nice solution where you don't need the power of the PC, and you

don't want all the headaches."

GTE has been testing Sun's network computer prototype, and Hagerty said the company may use them in kiosks and call centers.

Among the developers that will join Sun at Tuesday's announcement and show off software supporting Java Station are the following:

- Visual Components, a whollyowned subsidiary of Sybase, Inc., will demonstrate Formula One/ Java; a Java-based version of its Formula One spreadsheet.
- Oracle will demonstrate its Developer 2000 for the Web, which will run existing client/ server applications on the server so they can be accessed from a browser.
- SunSoft, a subsidiary of Sun, will announce Project Studio, which will let developers produce

SIZE: 4 by 6 by 14 in.

PROCESSOR: SUN SPARC

RAM: 8M bytes

OPERATING SYSTEM: Java OS

WEB ENOWSEM: Hot Java

NETWORK ADAPTEM: Ethernet

PRICE: \$800 to \$1,500

disposable applications from Java-Beans components without writing any code; Project Ice Tea, which was designed to connect Java clients to legacy systems; and Project Speedway, which is expected to make Java applets run faster.

Java has weaknesses, but developers are still committed. See page 45.

Court ruling spurs look at temporary workers

By Julia King

Companies that use contract programmers and other outside software personnel should take a break from systems development to double-check the employment status of their IS workers.

In the wake of a recent court decision that entitles hundreds of former freelance workers at Microsoft Corp. to back benefits, experts said information systems managers should learn the rules for determining whether a worker is classified as am employee or independent contractor.

"The Microsoft case has brought to the fore a lot of questions that have been lurking," said New York computer lawyer Esther C. Roditti. "Companies need to perform an internal audit and see who they've got on board and on what basis," she advised.

Clarify the rules

After that, "they need to tighten their own eligibility provisions so it's clearly stated who is and who isn't eligible for any company benefits," said Bill Sweetnam, a technical consultant at Towers Perrin, Inc., a compensation and benefits firm in Valhalla, N.Y.

Earlier this month, a federal appeals court ruled that several hundred temps who worked at Microsoft between 1987 and 1990 are eligible for some retirement benefits because they were treated like

Employee or contractor?

By IRS standards, workers are generally employees if they:

- Must comply with employer's instructions about work
- Receive training from the employer
- Must follow set hours of work
- Work for one employer at a time
- Can be fired by the employer
- Rely on the employer to furnish tools and materials

Source: IRS Manual 4600 - Employment Tax Procedure

employees [CW, Oct. 14].

IS managers in virtually all large companies routinely bring in outside contractors to supplement staffers on systems projects. Although the paperwork is typically handled by a company's human resources department, the legal test of a worker's employment status is how he or she is treated on the job.

The Internal Revenue Service has set 20 guidelines for determining whether workers are employees or contractors (see chart above). But without knowing the rules, IS project managers could easily, and unintentionally.

violate them and cost their company millions of dollars in the process.

For example, "if a company is supervising a person in their day-to-day activities, has set the pay rate and is suggesting when the person comes to work and leaves, that person is going to be viewed as an employee at the end of the day," said Ray Marcy, CEO

of Interim Services, Inc. in Fort Lauderdale, Fla. "The more a person is supervised, the more a person's an employee."

But at a time when companies are scrambling to snare hard-tocome-by technical talent, "no one's really monitoring" the situation, said Cheri Comstock, an IS recruiter at The Focus Group in Chapel Hill, N.C. To get around those and other pitfalls, Dick Brightman, vice president of IS at Liberty Travel, Inc. brings in only contractors who are employees of outside consulting companies.

"That way, there is a clear relationship between us and the consulting corporation. You don't have to worry about baby-sitting individuals." Brightman said.

Package to aid Web recruiting

By Julia King

Electronic job postings and Internet recruiting services have made life a lot simpler for job hunters. Sending a resume involves little more than clicking a mouse around a World Wide Web page.

But on the receiving end, an electronic avalanche is hitting human resources organizations. Many employ a full-time staffer just to send out paper or electronic-mail receipts for the thousands of applications that pour in each week

That is the business dilemma that Netstart, Inc. in Reston, Va., aims to solve with an Internet recruiting platform that combines resume management software with an Internet job search site. The company will announce its client/server-based TeamBuilder software as well as its Career-

Builder Web site (www.careerbuilder.com) today.

Pricing for the Windows NTbased software ranges from \$4,500 to \$6,000, depending on configuration. Posting 25 job openings to CareerBuilder costs \$2,000 a month.

It is the ability to manage Webbased resume information that differentiates Netstart from other Internet recruiting models, said Bill Bass, an analyst at Forrester Research, Inc. in Cambridge, Mass.

"Internet recruiting is already huge," Bass noted. "But by 2001, the \$4 million that companies spend posting jobs online this year will be about \$330 million. Netstart's success will come from managing all of the internal HR matters."

Netstart's TeamBuilder software automates dozens of timeconsuming tasks surrounding the recruiting and hiring process. Those include reviewing and routing resumes, replying to candidates via E-mail and measuring results of recruiting programs.

Wizard work

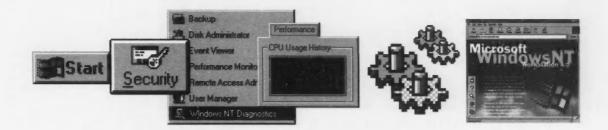
Using a built-in wizard, the workflow-based software also allows human resources personnel to build their own Web pages to dynamically post and update job openings.

Those openings can be posted to Netstart's CareerBuilder job site and eventually to The MonsterBoard (www.monster.com) and Career Mosaic (www.careermosaic.com), which together list tens of thousands of jobs.

New Web forum features online shoptalk for ClOs. See page 69. Microsoft Windows NT Workstation 4.0

has the ease of Windows 95. It has the power of Windows NT.

It has computers everywhere drooling.



The Windows NT* Workstation operating system has always been powerful, and now it's easier to use. It's easier because all that power is now controlled by the familiar Windows® 95 Interface. And besides having TCP/IP and the Microsoft Internet Explorer browser built-in for easy Internet access, Windows NT Workstation 4.0 has integrated Peer Web Services which lets small workgroups easily create their own intranets. Windows NT Workstation is also more reliable. It protects you from crashes because all applications run in their own memory space. Integrated <u>security</u> ensures

applications and data are safe from user error or tampering. Windows NT Workstation 4.0 also helps administrators manage networks better by letting them troubleshoot remotely, viewing individual systems from their desktop. So does all this mean Windows 95 is history? Absolutely not. Windows 95 may still be the best choice for some users, depending on existing hardware and applications. We suggest you visit our Web site to compare and contrast operating systems to see which 32-bit desktop is best for you. Think of it as a test drive without the annoying sales-guy.

Microsoft^{*}

Where do you want to go today?" www.microsoft.com/ntworkstation/

High demand for network gurus boosts pay

Type the word "networking" into the employment section of Hewlett-Packard Co.'s Web site and dozens of job listings pop up.

Repeat the process on other World Wide Web pages for top companies and the trend becomes apparent. "Demand in the marketplace [for networking skills] is outrageous," said Patricia Lopez, an associate at Fenwick Partners, a recruiting firm in Lexington, Mass

Lopez said the job market took a major jump in the past two quarters. "We're getting to the point where folks in networking see how attractive they are to the big boys.

And they are demanding compensation for it. A Computerworld skills and salary survey, to be published Nov. 18, shows that networking employees with TCP/IP expe-

rience are paid an average of 10.3% above the Career set salary for that skill.

spotlight Salaries range from \$60,000 to \$70,000 for

technical specialists and \$70,000 to \$80,000 for project leaders. Contractors earn an average of \$50 and up to \$90 per hour.

Increases in mobile computing, corporate intranet development and demand for Internet access have spurred the need for more temporary and full-time networking experts. According to the survey, more than 40% of information systems managers plan to hire staff with IBM's peer-to-peer networking experience in the next year.

Networking consultants are a hot commodity for companies that offer complete network installations to customers, said Bruce Hatz, corporate staffing manager at HP in Palo Alto, Calif.

"If you look at Cisco [Systems, Inc.], they're hiring like crazy, and we're pretty much competing for the same talent," Hatz said. "It's a real scramble to get top talent in the LAN/WAN environment."

Record surge

That is a fact that Keith Grossich, executive director of IS and technology services at Blue Cross/Blue Shield Association in Chicago, knows all too well.

The demand for people with local and wide-area skills and client/server is overwhelming," said Grossich, whose staff is a mix of consultants and full-time employees. "I've been in data processing since 1972 and haven't gone through a surge like this."

He said he is looking for LAN and WAN employees to implement client/server applications and handle capacity planning.

"An application is written and tested with 15 users, and now it's rolled out on 500 to 1,000 PCs. What's it going to do to your network?" he said.

Companies are demanding network troubleshooters who can tweak a router or monitor a frame-relay network. They also are seeking end-to-end WAN designers, who are even harder to find, said Louis M. LaMattina, manager of network services at Seek Consulting Group in Wakefield, Mass.

An administrator who knows how to build an intranet, integrate it and install a firewall is a hard find. LaMattina said. About 90% of the candidates his company places work as consultants, he said.

Evelyn Smith, a senior systems engineer at AG Communications Systems, a telephone switch maker in Phoenix, said it is getting increasingly difficult to find candidates with higher-level networking skills. The company has responded by offering broader WAN training for everyone.



Attention Visual Basic developers: Take me to your leader. Visual Database Design and Model-Driven Snalable Multi-User Development Applications Automated Management **Future Internet** and Intranet Deployment

Introducing DataBOT. Now it's insanely easy to design, build and maintain high-performance Visual Basic applications.

It's inhuman what Visual Basic teams have to go through to create highperformance database applications. Writing thousands of

Database-

Team

Ready Form

Development

Reusability



The Logic Works Enterpris ers' Suite for Visual Basic

lines of mind-numbing data access code. Months of boring, repetitive tasks.

But now you can give your grunge work to DataBOT"a software "robot" that speeds application construction and run-time data access. And integrates with ERwin®-the #1 database design toolto provide a true modeldriven development environment from start to finish.



From the same database design, ERwin generates your SQL database and DataBOT builds the corresponding, ready-to-run Visual Basic forms and SQL data access code. You get faster development, automatic transaction management.

scalability and incredible team productivity. Without having to write a line of data access, synchronization or multi-user concurrency code.

DataBOT. It'll make you feel human again. Take it to your leader right away.

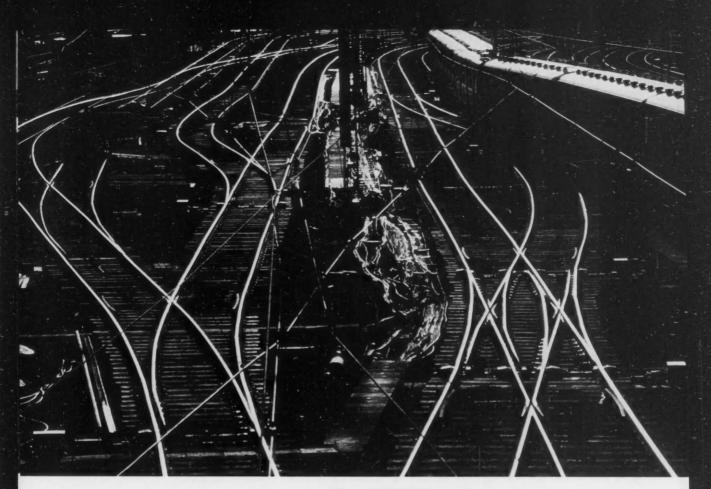


The Model Management Company

Check out a DataBOT demo at www.logicworks.com. Or, call us at 1-800-78-ERWIN for special introductory pricing.

@11998 Logic Works, Inc. ERwin is a registered trademark and DataBOT in a trademark of Logic Works, inc. All other products mentioned are trademarks of their respective companies.





Where you end up tomorrow depends on the information you have today.

The right data warehouse can make all the difference.

Your database contains valuable information. Information that could have a vital impact on your company's future. Why not use it to your advantage? That's where Informix comes in. Informix's data warehouse solution helps you manage your corporate information wisely, so you can stay ahead of your competition.

When you consider things like performance, scalability and extensibility, there is no better name in data warehousing than Informix. And Informix is the only database vendor with Integrated Relational OLAP, which provides powerful analysis capabilities on an open architecture that can scale from the smallest data mart to the largest data warehouse. And despite providing the most advanced data warehouse solution on the market, Informix technology remains as easy to use as ever.

Informix partners with hardware, storage and extraction tools vendors, and systems integrators to provide the very best of breed solutions for your business. And Informix's technology is proven. Leading companies in telecom, finance, retail, insurance, banking and many other industries have all prospered with the help of Informix data warehousing. For more information, call **1-800-688-IFMX**, **ext. 68**.



Constant at Compaq: Exec exodus

By Jaikumar Vijayan and Kim S. Nash

The impending exit of Compaq Computer Corp.'s No. 2 executive has raised questions about whether the PC maker's blistering pace of change is driving people away.

In what seems to be a continuing exodus of top managers, Houston-based Compaq last week announced the resignation of Ross Cooley, its senior vice president and general manager in North America.

Cooley will become chairman and CEO of PcOrder.com, an electronic commerce firm in Austin Texas on Oct 31

Cooley is the eighth senior executive to leave Compaq in the past six months and the second this month Mark Canena, who was hired from Hewlett-Packard Co. to lead Compag's new workstation division, quit earlier this month afjust two weeks at his post.



Cooley, who has been with Compag since 1984, is widely considered responsible for building Compaq's distribution channels and was one of its most visible spokesmen. Rumors of his retirement have been floating around for some time, but his decision to quit surprised observers.

"I was blown away. Cooley's been a rock over there," said Jim Greene, an analyst at Summit Strategies, Inc. in Boston. "There's nothing visibly amiss, but you've got to wonder what's under the covers."

"They are losing their biggest cheerleader for the channel just at a time when they need channel relationships the most," said Joe Ferlazzo, an an-'alyst at Technology Business

Research, Inc. in Hampton,

Compaq last week downplayed the string of high-level departures and attributed the resignations to personal reasons on the part of each executive. But analysts speculated that the resignations could be a direct result of the rate of change at Compaq. CEO Eckhard Pfeiffer's goal of making Compan the third-largest computer vendor in the world by 2000 has pushed the company in several directions at once.

Corporate change

In the past year. Compag has started an internetworking di-

vision, a workstation business. acquired companies accelerated its push into the enterprise server arena.

It also appointed Richard Snyder to the newly created position of senior vice president and general manager.



marketing, service and support. Among those reporting to him will be James Schraith, who replaces Cooley as the vice president of the North America unit.

"There is some real intense pressure on executives at Compaq these days," said John Dunkle, president of Workgroup Strategic Services, Inc. in Portsmouth, N.H.

One user said he won't worry unless Compaq products begin to falter. "The departure I found most troublesome was Gary Stimac," said Jim Marra, a corporate director of technical planning at Partners HealthCare System.

The Boston-based managed health care group has standardized on Compaq ProLiant servers and runs 100 of them in several Massachusetts sites.

Despite the loss of its top executives. Compag's business keeps rolling along

In the last quarter, the firm reported earnings of \$350 million, up 43% from the comparable period last year.

Compaq workstation invasion may drive down low-end prices

and April Jacobs

Users are likely to win big in what is shaping up as a bruising battle for the low-end workstation mar-

Compaq Computer Corp. in Houston will set the stage this week when it announces a line of Intel Corp. Pentium Pro-based Windows NT workstations. The workstations cost between \$5,000 and \$15,000 range. They are exnected to lead the Wintel charge into the low-end Unix workstation

Analysts said that is likely to have the following effects:

•All workstation prices could drop rapidly in the next year. Previously, cash-rich Compaq has used its enormous PC manufacturing volumes to buy market share and drive down prices. Analysts expect Compag's presence to have the same effect in the lowend workstation market

· Compaq's entry also is expected to speed the trend among software vendors to port Unix workstation software to Windows NT.

Some of that has already begun with the entry of Unix vendors such as Hewlett-Packard Co., Digital Equipment Corp. and Intergraph Corp. in the NT market.

"Most of the groundwork has

Workstation wars

pag's entry into the accelerate the porting of Unix Windows NT. The Compag boxes include:

PROCESSOR: 200-MHz Pentium Pro

OPERATING SYSTEM: Windows NT

Graphics capabilities from companies including Elsa and Intergraph

PRICE DANGE: \$6,000 to \$15,000

been laid by other vendors already. What was really needed for Wintel workstationsl to take off was a mass-market player," said Terry Bennett, president of The Bennett Co. in Portland, Ore.

Pompi Malik, manager of information systems at Brewers Retail, Inc. in Mississauga, Ont., said Compag's arrival will be welcome from a price and performance standpoint.

"It's not just Compaq we're interested in," Malik said. "We've seen some very aggressive pricfrankly, all of this is great."

Despite its potential to set the pace in this market, Compaq's success isn't assured, analysts said. For one thing, rivals such as HP and Digital bring years of experience servicing and selling to the Unix workstation market. Those firms have installed bases to work from and long-established ties with software vendors and distribution partners.

Compag only recently set up a senarate workstation division and is building a support and distribution infrastructure

The higher-end Unix workstation market also may be a difficult nut to crack. Unix workstations from vendors such as Sun Microsystems, Inc. and Silicon Graphics, Inc. pack a lot more power and features than Compaq's boxes and are likely to continue dominating the higher-margin midrange and high-end markets.

In the short term, "I don't think any of the PC vendors will be able to compete in the traditional Unix workstation space," said Chris Goodhue, an analyst at Gartner Group, Inc. in Stamford, Conn.

'If you want to get the most out of high-performance workstations, you might [still] need to pay \$20,000 to \$50,000," Goodhue

Rewritable CDs are near blastoff

By Matt Hamblen

Business PC users by March could replace their floppy disks with high-capacity CDs that can be written upon and edited over.

CD-ReWritable - CD-RW technology took another step toward legitimacy last week when five major companies announced standards to produce CD-RW discs and drives for sale in the first quarter next year.

Whether the \$1 floppy disk gets replaced by the \$20 to \$25 CD-RW disc is an open question. The CD-RW disc can hold 680M bytes of data - roughly 500 times the 1.4M-byte capacity of a floppy.

Philips Electronics North America Corp. in San Jose, Calif., said it will ship a CD-RW drive with adapter card and software that will cost less than \$1,000.

But the price of the drive will have to drop to \$750 or even \$500 to get the market moving, said

ident of Freeman Associates, Inc. in Santa Barbara, Calif. CD-ROM drives cost \$100. Hewlett-Packard ics, Inc. and Mitsubishi Chemical America, Inc. also will make CD-RW discs or drives.

AOL offers junk-mail protection

America Online, Inc. last week instituted filters to block E-mail from about 50 sites it has identified as sources of junk mail sent to its customers.

Users can switch off the filters in the PreferredMail program, unlike in earlier blocks

Earlier this fall, bulk E-mailer Cyber Promotions, Inc. won a court order that stops America Online from blocking E-mail from Cyber Promotions domains; a judge said the blocks were a freespeech violation. America Online officials said the new filters replace the earlier ones.

Users with a lot of time on their

hands who want to switch off the filters can go to the keyword "PreferredMail" and check the "I want iunk E-mail!" option. More important, information systems managers who want to see America Online's list to use in their own junk mail filters can find the list at the same keyword location.

Meanwhile, CompuServe, Inc. last week won a restraining order that blocks Cyber Promotions from using CompuServe accounts to send E-mail, referencing CompuServe accounts or making it appear in any way that CompuServe is involved in Cyber Promotions' junk mailings. - Mitch Wagner

In order to make the right decisions, you've got to have the big picture. But where is it?

What computing solutions do you have?

You should have OpenView solutions from Hewlett-Packard, the clear leader in integrated network and systems management. HP OpenView gives you the power to evolve your IT environment as quickly as your business. We've already provided thousands of companies around the globe with higher service levels and availability. And we can do the same for you. If the business decisions are yours, the computing solutions should be ours.







Apple cuts prices, but PC users don't bite

By Lisa Picarille

Deep price cuts on some of Apple Computer, Inc.'s consumer and low-end business systems are welcome relief for the Macintosh fold but not enticing enough for PC users to switch, analysts and users said.

Apple's recent price slashing between 20% and 29%, depending on model — for the first time put the price of some Macintoshes at or below the price of comparably equipped PCs.

For example, the price of Apple's 200-MHz Performa 6400 dropped from \$2,799 to \$2,199.

Looking good

One user said the price reductions make Apple products very attractive.

"We are really excited," said Sue Rusiecki, a Macintosh computer manager at Hampshire College in Hadley, Mass., which has more than 500 Macintoshes. "This means that we no longer have to consider price as a barrier for purchasing more Macs."

Another user said the dramatic price drop is turning his attention back to Apple rather than the once-cheaper Macintosh clones.

"We aggressively pursued clones, particularly those from Power Computing, as an alternative and stable supply and because of the cost/benefit ratio," said Mark Stelzner, editorial publishing director at Gruener & Jahr USA Publishing, a New Yorkbased magazine publisher. "But the cost benefits have shifted in Apple's favor on the low end so that, going forward, we are much more likely to use Apple as a supplier of the standard workstations to our editorial department."

The other factor in the decision to move to Apple, according to Stelzner, is Macintosh clone maker Power Computing Corp.'s delays in shipping products.

"Maybe it's dumb luck on Ap-

Break out the hatchet

Apple has slashed prices to compete with clones and PCs

COMPANY	Apple:	Power Computing	Compag
Model	Performa 6400	PowerBase/200	Deskpro 6000 Model 5200
Снір	200-MHz PowerPC 603E	200-MHz PowerPC 603E	200-MHz Pentium
HARD DRIVE	2.4G bytes	1.2G bytes	1.08G bytes
RAM	16M bytes	16M bytes	32M bytes
CD-ROM	8x	8x	8x
PRICE	\$2,100	\$1,795	\$2,865

ple's part, but the timing couldn't be better, and Apple may be able to reclaim a lot of users that wandered off in frustration," Stelzner said.

Apple's price reductions on some of its low-end Power Macintoshes were much-needed, said Eric Lewis, an analyst at International Data Corp. in Mountain View Calif "Prices on some of the Power Macs were seriously out of whack compared to PC systems, and the prices needed to come down dramatically," he said.

Small impact

But another analyst said the price cuts will have little impact on increasing Apple's market share.

"It's pie in the sky to think that

Apple will explode in market share because of these price cuts," said Tom Rhinelander, an analyst at Forrester Research, Inc. in Cambridge, Mass. "Price is not really the issue. Price cuts will not affect anyone who was not considering a Mac OS system. It will only impact those that already wanted a Mac and watch to get the best prices."

Connie Dillard, microcomputer specialist for the municipal government of San Carlos, Calif., agreed.

"Price has never really been the issue for us," said Dillard, who noted that she was a big fan of the Macintosh. "The issue for us is to standardize on one platform that is easy to support and fits our requirements for working with other government agencies — that is the PC."

Apple unveils new Newton and portable computer. See

Internet Society wrestles with domain name expansion

By Gary H. Anthes

The Internet Society in Reston, Va., last week said it had formed a group to consider expanding the number of companies that register Internet addresses and greatly increasing the number of high-order domain names of the type.com and

The society voted in June to accept a proposal to expand the number of registries and domain names, but the idea met considerable opposition. The society has since put the brakes on and is opting to go the committee route — which may kill the idea.

Improving service

The intent is to bring users better service and lower prices by expanding the number of "name registries" from the only provider, Network Solutions, Inc. in Herndon, Va.

Under government contract, Network Solutions assigns names, such as acme.com, and charges \$50 per year for their use.

Another intent is to relieve congestion in the .com domain and to help resolve disputes over domain names should, for example, Acme Book Co. and Acme Computer Co. vie for the name acme.com.

"Ten million businesses in North America will be connected to the Internet within the next three years, and there's a

dearth of names out there," said William L. Schrader, chairman and CEO of PSInet, an Internet service provider in Herndon, Va. But some users said the idea of expand-

But some users said the idea of expanding the list of "international top-level domain names" from five to as many as 150 names is flawed.

"The problem is not that we don't have enough domain names," said Ken Crutchfeld, a staff consultant at The Dun & Bradstreet Corp. in Parsippany, N.J. "What we really need is a clear, simple directory service that gets you to the company, product or page you want."

A directory service would let users enter, for example, "Acme Book" and get routed via the directory service to the right address. Entering just "Acme" would produce a list of companies with that name.

Crutchfield and others said they worried that expanding the high-level domain name space will equally expand the problems that exist now at the second level — for example, at the "acme" level in acme.com. He pointed out that when toll-free 888 telephone numbers became available, companies rushed to get the same seven-digit numbers they already had in the 800 system.

For more info

Information about the proposed changes to Internet domain naming can be obtained from the Internet Assigned Numbers Authority at www.isi.edu/divy/jana. Legal guidelines and information about Internet issues, including the use of domain names, can be found at www.patents.com.

"It was just an increased cost of doing business," he said.

The domain name space "is getting congested and doesn't offer the flexibility people want," countered Donald Heath, president of the Internet Society. But he acknowledged that the idea of expanding the Internet addressing scheme is controversial and added that the idea may not pan out.

"We may look at this and say, 'Hey, it's not a good idea, and we are not going to proceed with it,'" Heath said.

The group, dubbed simply the International Ad Hoc Committee, will consist of representatives from the International Telecommunication Union, the World Intellectual Property Organization, the International Trademark Association, the Internet Society, the Internet Architecture Board and the Internet Assigned Numbers Authority. Members are expected to be named this week, according to Heath



Internet Society President Donald Heath: The domain name space 'is getting congested and doesn't offer the flexibility people want'

Critics say most companies' Web site designs don't lure new business. See page 61.

Outsourcing, Windows NT top IT to-do list

By April Jacobs

Preliminary results from a new study confirm that the "mind share," or buying intentions, for Microsoft Corp.'s Windows NT is expanding among corporate information technology managers. The IT executives are also calling upon outsourcers to provide broader skills in managing desktops and complex networks.

"Money is ancillary to getting the job done," said Priscilla Tate, executive director of the Technology Managers Forum, which conducted the study of 170 IT professionals in conjunction with International Data Group, the parent company of Computerworld. Among the initial findings are the following:

• Although only 20% of the companies surveyed have implemented NT, a whopping 80% of them plan to install it somewhere in their organizations within the next 18 months. Yet those shops with heavy investments in Novell, Inc.'s NetWare are more likely to mix in NT and work with both envi-

ronments.

The average number of network users per network staffer is 106, according to the preliminary results of a study done by the Technology Managers Forum.

Get in line

"How much pain is it worth?" asked one information systems vice president at a large New York financial institution. "NT is where everything is moving. But at a certain number of nodes, you get

past the point where it's realistic" to migrate users and retrain support staff for a different operating system, he said.

- Companies are supporting more users in remote locations. Among those surveyed, the average network had 6,800 nodes and covered 64 remote locations.
- To get more use from their outsourcers, users are demanding more technical expertise of this temporary help, especially in dealing with desktop support. The maintenance tasks being asked of desktop outsourcers, for example, are moving beyond simple hardware fixes and into memory management and other software areas.
- On average, the companies surveyed spend \$180,000 on intranet site development and \$300,000 on Internet site development annually — despite a conviction that business benefits are still elusive. More than 80% said they believed their networks are instrumental in giving their companies competitive advantage.

John Osterman, director of networking technology at BankBoston Corp. in Boston, said his firm, with more than 10,000 desk-tops, is trying to watch the bottom line by standardizing hardware and software and limiting its number of service providers. The bank's global network covers 24 countries.

"If I buy from one [vendor], I have much more leverage to negotiate," Oster-

man said. BankBoston also buys only Compaq Computer Corp. servers and acquires most of its desktops from Digital Equipment Corp. "Having an architecture and standard configurations

drive costs down," he said.

Gary George, director of corporate applications at Liberty Mutual Group in Boston, said his company probably won't migrate to Windows NT because it already has a huge vestment in NetWare

"We'll use NT servers for mail but Net-Ware for everything else," he said, noting that cost issues played heavily in that decision



CONTINUED FROM PAGE 1

the past six months. Cabletron Systems, Inc. has shelled out more than \$300 million in the same six-month period to buy three companies. 3Com Corp., which is working on its 14th acquisition in four years, will spend \$315 million on two firms this year. Bay will have spent roughly \$210 million on three firms in the past six months.

The vendors defend their diversification efforts — mostly in the wide-area network equipment and

1996 networking consolidation crunch
January – Bay Networks
confirms it will be late shipping key switching products
July – Madge Networks posts first loss since going public in August 1993
July – Cisco phases out some ATM switches after \$48 StrataCom merger
August – Cisco buys

Cabletron reseller Nashoba Networks

October – Bay's earnings

October – Madge prepares sweeping layoffs

October - UB Networks up for sale

remote access markets — by promising one-stop shopping, but users aren't buying it.

"IBM tried that, and it failed. Cisco is trying it now and probably won't be successful," said Jerry Wetherington, systems coordinator and networking specialist at the University of Florida in Gainesville. "These companies become so large and preoccupied with acquisitions that you can't get questions answered in a timely manner, products delivered on time and new technologies like [Asynchronous Transfer Mode] pushed ahead at the same pace."

"The really scary part is that the mergers seem to happen only after users have committed to certain vendors," said Bob Moscowitz, a technical support specialist at Chrysler Corp. in Centerline, Mich. "You don't find out until later if you won or lost."

Moscowitz defines losing as when a key provider is bought by a rival of your other key vendor. "You can expect pressure from management to reevaluate earlier decisions and maybe take action.

Dealing with change in this scenario causes problems," he said.

Moscowitz defines winning as being lucky enough to have one of your key vendors swallow up your other key supplier. Chrysler saw two of its key players — SynOptics Communications, Inc. and Wellfleet Communications, Inc. — merge to form Bay Networks, Inc. The result was a single point of contact for hubs and routers.

Shakeout rumors

Competition is another issue. "We are extremely worried about the lessening of competition brought on by constant mergers and acquisitions." Wetherington said.

Even more unsettling to users is a looming market shakeout, analysts said. For example, Computerworld learned last week that Madge Networks, Inc. plans worldwide layoffs after a global restructuring. Also last week, UB Networks, Inc. confirmed rumors that parent company Tandem Computers, Inc. may sell UB. And Plaintree Systems, Inc. reported a \$2 million net loss for its quarter ended Sept. 30.

"The shakeout will hit LAN switch vendors of all sizes," predicted Eric Hindin, an analyst at The Yankee Group in Boston. "Not only will billion-dollar-club vendors disappoint Wall Street by not meeting expectations, but one or more could report a quarterly loss in 1997."

Other fallout issues concern product phaseouts or dumpings that occur after two companies with overlapping product lines become one.

This happened last year with 3Com after it bought Chipcom Corp. and phased out the Galactica Ethernet switch.

Users skeptical of LAN switch vendors' attempts to buy into WAN gear markets. See page 53.

Tools carry client/server apps to World Wide Web

By Sharon Gaudin and Frank Hayes

Oracle Corp. and Powersoft Corp. are getting into the moving business — moving client/server applications to the World Wide Web.

The software giants next week will separately unveil products

that can port client/ server applications to a server so they can be accessed from a Web browser.

Users and analysts said the products will save developers a lot of time in their rush to put applications on the Web.

Simpler process

Oracle, in Redwood Shores, Calif., will announce Developer 2000 for the Web at Sun Microsystems, Inc.'s network computer unveiling in New

York (see related story, page 8).
Powersoft, a subsidiary of
Sybase, Inc., will release its
Internet Developer Tool Kit for
PowerBuilder at the Software
Development '96 Conference in
Washington.

"Giving access to the information from a browser simplifies things dramatically for us," said Michael Prince, chief information officer at Burlington Coat Factory Warehouse Corp. in Burlington, N.J. Prince uses Oracle's Developer 2000 first for in-house applications and then for Internet access.

But sometimes the tricky part

is moving those applications to a browser-accessed server.

Without porting tools, moving the application would require a time-consuming programming effort and may mean having to learn a new language, such as Java.

"With these products, you don't have to learn a new language.

aged in the box so users can start developing as soon as the software is installed.

"It's a full-shopping-cart application," said Cecil Craft, president of Craft Enterprises, Inc. in Irving, Texas, which sells National Football League (NFL) merchandise on the Web.

"I took PowerBuilder for the Web and built my application for the NFL catalog in between 200 and 300 hours. Considering the alternative of doing it in Java or C++, that [development time] is pretty trivial," he said.

Slimmer clients

Oracle's Developer 2000 was designed to move applications off the Windows desktop to the server.

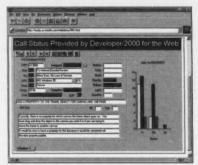
It also includes a Developer 2000 software server that will sit on

the middleware server, which allows the Web browser to run applications.

"It's a dynamite product," Prince said. He said Oracle's Developer 2000 lets him significantly slim down his fat clients, which allows the applications to run faster.

Quinn warned that both products are just intermediary steps because they offer only emulation of applications.

"They don't provide any strategic leap of technology. Neither company will be able to rest on these laurels for too long," he



Oracle's Developer 2000 for the Web was designed to move applications from the Windows desktop to the server

That's going to save people a lot of time," said Evan Quinn, an analyst at International Data Corp. in Framingham, Mass. Powersoft's tool kit has the fol-

Powersoft's tool kit has the following key features:
• A PowerBuilder Window Plug-

In that lets developers move applications to the Web.

• A Data Window Plug-In to access reports on the server from a

browser.

Two class libraries, one to handle data management and one to build custom Hypertext Markup Language forms.

• A Personal Web Server pack-

Transfer of ownership makes D&B users wary

By Randy Westo

Customers of Dun & Bradstreet Software are keeping a wary eye on the company's new owner, wondering if Geac Computer Corp. can manage such a large purchase. The Markham, Ontario, firm said it will buy D&B Software in Atlanta for \$150 million.

Dick Hudson, chief information officer at Global Marine, Inc., an offshore drilling company that uses D&B Software's Smart-Stream business applications, said he will wait and see. "I don't know anything about [Geac] or its

practices, not that I have much of a choice since I'm tied to Dun and Bradstreet products," he said.

Hudson said he hopes Geac "lets Dun and Bradstreet concentrate on their core business, which is applications, and supports the marketing and research divisions so the company can remain a major player."

Business as usual

D&B Software and Geac are telling users it will be business as usual if the acquisition is approved early next month. For example, D&B Software pledges a

rollout early next year of Smart-Stream for Microsoft Corp.'s SQL Server 6.

Analysts have said they aren't sure if Geac, a company with \$230 million in sales last year, can handle a company as large as \$350 million D&B Software. Most of Geac's purchases have been of small niche-market companies such as Pro-Mation, Inc., a \$3 million Salt Lake City-based maker of project management software for construction companies.

Geac is a "loose-knit conglomerate of software portfolios," said Barry Wilderman, an analyst at Meta Group, Inc. in Stamford, Conn. He said D&B Software will represent about half of Geac's holdings and its success will depend on the management team that is put in place at D&B Software.

Wilderman pointed to Sterling Software, Inc. and Computer Associates International, Inc. as examples of firms that have pulled off such arrangements.

"They need to consolidate some of their product lines and take advantage of their strengths like work flow," Wilderman said.



Everything you're looking for in PCs.

From a place you probably didn't look.

You might not think of Unisys as a place to find state-of-the-art PCs for your company. But



all that's changed with Aquanta™ PCs and servers. This new product line matches—and even surpasses—the best

the PC world has to offer.

Aquanta means quality, with rigorous testing that ensures mainframe-class dependability for mission-critical applications.

Aquanta means performance, with one of the industry's most powerful and scalable product lines—including multiprocessor models with Pentium® chips and Pentium® Pro chips, SMP servers and fault-resilient servers.

Aquanta means compatibility, with support for all major operating systems and networks to simplify client/server computing.

Aquanta means support, through Unisys worldwide experience implementing technology across departments, companies and countries.

And finally, Aquanta means this: While we may not be the first place you look for PCs, we just might be the last.

http://www.unisys.com or 1-800-874-8647, ext. 244

© 1996 Ultimes Corporation. Aquamité is a trademark of Ultimys Corporation. The Intel Inside Login and Pentium are improved trademarks of Intel Corporation.



The Information Management Company

IT'S ONLY LOGICAL THAT INTELLIGENT MANAGEAB (Now, What The Heck Is In



Perception for a computer and every new Compaq Deskpro has it. It lets you know if something's going to happen before it actually does. This way you can manage all of the desktops on your network from one location.

Taking inventory, for instance, of all hardware and software is done simply and efficiently from one Deskpro. Or if a hard drive's about to fail anywhere, you'll know ahead of time. As before, Intelligent Manageability backs up

your data on the network in case of failure; but now, thanks to our new PD-CD drive backup, it also preserves your data locally.

Okay, so our newest version of Intelligent Manageability is smart.

But affordable? Considering that the Deskpro line from Compaq starts at around \$1,100, we think so.

Equally impressive are the highperformance features. Up to Pentium* Pro 200 processors. Choice of PCI graphics. Plus a choice of EIDE and Ultra SCSI hard drives.**

And maintenance? That's easy

I need a vacation.

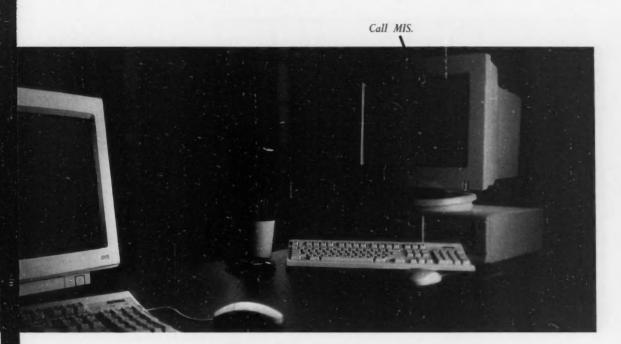
I'm burnt.

because we deliver continually updated support software via our Web site and CDs. And so is upgrading and servicing, thanks to a quick-release CPU hood and accessible components."

In the end, Intelligent Manageability gives you a lowered cost of



ILITY ALSO COMES WITH AN INTELLIGENT PRICE. TELLIGENT MANAGEABILITY?)



ownership, a three-year warranty and dedicated toll-free technical support that's open for business seven days a week, 24 hours a day. And what could possibly be more logical than that? For more, visit us at www.compaq.com or call 1-800-392-8883.



COMPAQ

Has It Changed Your Life Yet?

Monorail tracks into low-cost PC market

Quick, what's the first thing that comes to mind when someone says "monorail"?

Most people think of Disney World, but a

Monorail, Inc. in Marietta, Ga., today will unveil a full-featured PC that it hopes will supplant, or at least share space with, Mickev Mouse and the Magic Kingdom in the

"The market for low-priced PCs has not been exploited. With a decent machine, they could really do well," said Dean McCarron, an analyst at Mercury Research

in the fact that nearly every major

"first" in power management has

our name on it. Including the first

power conditioner that uses a "virtual"

battery to simulate a battery instead of the

Rob Enderle, an industry analyst at Giga Information Group in Santa Clara, Calif., said Monorail had anticipated the market well. "This PC will be a great telephony so-

"The market for low-priced PCs has not been exploited. With a decent machine, they could really do well."

-Dean McCarron, analyst, Mercury Research

lution for receptionists and a better answer than a network computer for a company that needs a PC connected to a network." he said.

Enderle and McCarron said any new PC manufacturer faces some major hurdles because of very tight margins and fierce competition from well-established companies. However, Enderle said, Monorail's management team includes several savvy former Compaq Computer Corp. executives who seem to know what they are getting themselves into.

The Monorail PC will have a 75-MHz Advanced Micro Devices, Inc. processor, a 1G-byte hard disk drive, 16M bytes of memory, a four-speed CD-ROM drive, built-in stereo speakers, a 10.4-in., dualscan flat-panel monitor, Windows 95 and online service software. It all comes in a sealed case for less than \$1,000 and will be available by Thanksgiving.



... Today, people and companies the world over rely on electronic systems. And it's more important than ever to protect data that's critical for business. Keeping those systems up and running 100% of the time requires having two

kinds of power within easy reach. Electrical and personal. Electrical, to protect against power fluctuations ranging from

spikes and surges to total outages. And personal, to control not just the availability of power, but also the consistent quality and knowledgeable management of power

···· For that, you need more than merely UPS (Uninterruptible Power Systems) hardware. You need Strategic Power

Management.™ A systematic approach that mobilizes

technology, service, and software, as well as hardware, to ensure critical-system uptime.

Superior technology. You can take comfort

ares Prestige 1900 1996 U.S. Olympic Edit

our more than 1,000 factory-trained technicians. (The world's

Worldwide service. Help and

consultation are always near from

stark realities of draining a real one.

largest dedicated UPS service force, available 24 hours a day, worldwide.)

Comprehensive products. To satisfy any need you might have, we offer the industry's

widest range of off-the-shelf and customized solutions for everything from a worldwide network to a desktop PC.

So, what can you do with power?

Contact us, and you can do just about anything you want.

Within U.S.A.: [Tel] 1-800-554-3448, ext. NOT or 1-919-872-3020, (FAX) 1-800-75-EXIDE International: (Tel) +1-919-870-3235, (FAX) +1-919-870-3300, Internet: http://www.exide.com/exide/. Email: info@exide.com/

V.....

is a trademark of Exide Electronics Group, Inc. DataFrame M is a trademark of DataTrax Systems, a wholly-owned subsidiary of Exide Electronics Group, Inc.







HARD DRIVE: 1G byte

MEMORY:

16M bytes, expandable to 8oM bytes

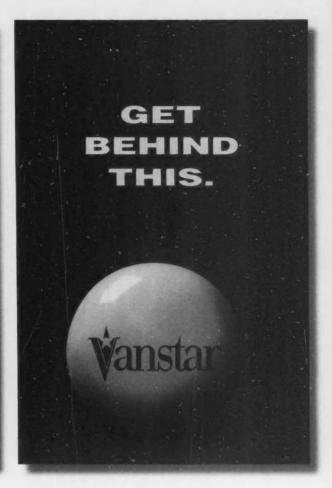
MODEM:

33.6K bit/sec. CD-ROM: Four-speed drive

OTHER

Online service software and stereo speakers

IF
MANAGING
THOUSANDS
OF PCS HAS
YOU BEHIND
THIS



If your mainframe-based enterprise has expanded to include thousands of PCs and servers, while your internal resources haven't, call Vanstar, the distributed computing experts.

Vanstar offers the network management and life cycle services you need to manage growth: consulting and design, network planning, integration, procurement, financing, installation, and deskside support. Everything you need to break free of your internal constraints.

With Vanstar, you choose as much, or as little, of our expertise as you need to master your distributed computing environment. That flexibility is why hundreds of Fortune 1000 companies have selected Vanstar.

To learn how you can stay ahead, please visit us at www.vanstar.com/8ball or call us at 1-800-994-2345. We'll help you make a clean break.





Finally, an HR system that understands "Can I get back to you on that?" is not an appropriate response to your CEO.

You know the feeling. Your boss appears in the doorway, asking for information that your current HR software just can't produce on demand.

Fortunately, with a Human Resource Management System from ADP, everything from benefits projections to staffing analyses is just moments away. Because our systems are so flexible, they allow you to access the information you want, the way you want it.

And with over 20 years of HR experience, ADP will be there to guide you every step of the way. From current system analysis to new system implementation to ongoing maintenance, we'll provide a support team dedicated to your needs.

No wonder over 5,000 companies rely on ADP for HR solutions. Whether your company is LAN- or WAN-based, requires single-user or client-server platforms, we provide solutions that seamlessly integrate your HR, benefits and payroll information.

So the next time your CEO asks for information, you'll be able to deliver it on the spot. To find out more, visit us at adp.com or call for a free demo disk.

1 800 CALL ADP ext. 389

www.adp.com

3Com offers firewall as free software upgrade

Picking a security package for LAN internetworks has become more complicated since 3Com Corp. announced a limited firewall strategy for its NetBuilder routers.

Internetworking vendors such as Cisco Systems, Inc. and Bay Networks, Inc. have tried to address mounting user concerns about network security. But analysts said most vendors' firewall strategies are incom-

Under 3Com's plan, users need only a free software upgrade to add firewall capabilities to NetBuilder routers. But conspicuous in its absence was a stand-alone workstation-based system needed to provide more robust security features.

"Router-based approaches provide basic firewall capabilities. The best strategy is to combine that with a stand-alone system that provides a more menacing and powerful barrier to the resources you want to safeguard," said Tom Nolle, president of CIMI Corp., a Voorhees, N.J., consultancy.

"What's happening is that the industry is lumping all firewalls into one category. where, in fact, there are huge differences in sophistication. That makes it tougher for users to decide what they need or don't need."

> - Tom Nolle. president, CIMI Corp.

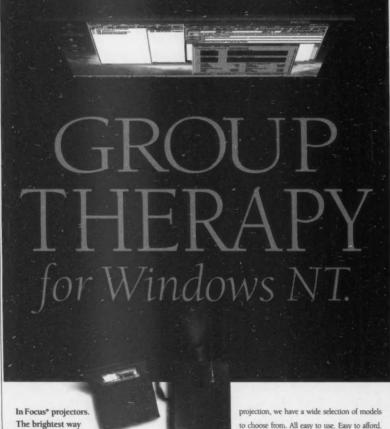
One early user said he is pleased with 3Com's router approach to firewalls. "The capabilities work well, and it's very easy to set up filter tables and logs for the routers," said Dax Lee, a network manager at Golf-Web, Inc., a Cupertino, Calif., provider of World Wide Web-based golf resources.

"The combination approach would be useful, as it would provide two layers of security, but would be best for users with larger networks," Lee said.

Users face many challenges in making their LAN internetworks secure.

"What's happening is that the industry is lumping all firewalls into one category, where, in fact, there are huge differences in sophistication," Nolle said. "That makes it tougher for users to decide what products they need or don't need."

There are vast differences in price. For example, 3Com's approach is a free software upgrade, but buying a stand-alone system for a central site costs users anywhere from \$3,000 to much more than \$20,000.



Windows NT® 4.0 is finally here. And that's great news, except that no one knows how to use it. We can help.

to train your users.

Start with am In Focus projector. It takes what's on your computer screen and projects it to an entire room full of people. So you can teach everyone in your office how to run a computer again-all at the same time.

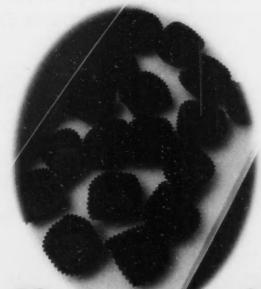
And since we're the world leader in multimedia

And they're all ready to project Windows NT 4.0.

Call us, and we'll have one on your desk tomorrow with our Instant Access Rental Program. It'll help keep all that Windows NT training from driving you nuts

Project now: 3-day rental for the price of 1 1-800-294-6400 or www.infocus.com/cw





If opportunity hung around waiting for y after it knocked, any database server would do.

> Digital 64-bit technology and Informix. The competitive edge.

Face it: speed matters. And together Digital and Informix can deliver it to your company in the form of blindingly fast OLTP, data warehousing and other key applications. With Dynamic Scalable Architecture™ from

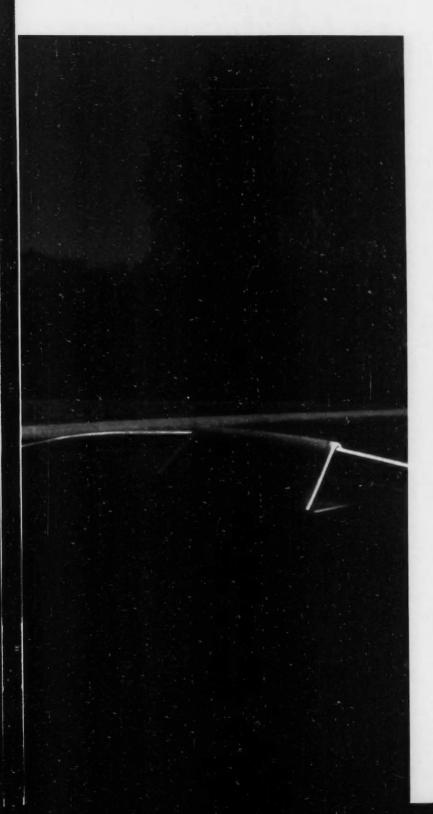
Informix and Digital's Very Large Memory, // INFORMIX* d you'll manage and manipulate data in ways never before possible. But don't wait around — find out more by calling

1-800-688-IFMX, ext. 63 or 1-800-DIGITAL, press 4, today.

www.informix.com www.digital.com

Remember the thrill you got the first time you were in complete control?





The feeling's back.

Sure you were nervous when you got behind the wheel, but once you got the hang of it, barreling that baby round the track put you on top of the world.

Today, you're trying to manage something that's a lot more complicated. A network computing environment that includes mainframes, servers and desktops scattered all over the planet. You need a management solution. A smart one.

Maybe that's why so many companies are relying on us to bring order to the way they do business. Which is what Tivoli TME 10" is all about. Because it's the only mainframe-to-desktop management solution that's highly scaleable, truly open and capable of operating transparently across all major platforms (including the most popular versions of UNIX," NetWare," Windows," Windows NT," MVS," OS/2," and OS/400"). Plus, with Tivoli Manager for Applications, it's the one and only proven environment for mission-critical applications management.

And now, with all the worldwide resources of IBM® behind us, we also deliver unmatched service and support wherever you do business.

So, if you're ready to get back in complete control, give us a call. We can put you behind the wheel again.

1 800 965-8548 www.tivoli.com



Managing Network Computing. The Smart Way.

Computer Industry

Third-quarter financial report card

	: Percentage :		: Percentage
	change		change
	from		from
Revenue	Q3 1995	Income	Q3 1995

Baan Co.

\$97.7M 80% \$9.3M 300%

Officials at the enterprise software maker said margins increased during the quarter and that a major deal was signed with Sun Microsystems to enhance JavaSoft.

Microsoft Corp.

\$2.3B 14% \$614M

Microsoft credited its diverse product mix for its continued solid growth. Sales of Windows NT were particularly strong. Factoring out the Windows 95 sales blip of last year, Microsoft's year-over-year revenue would have been up 30%

Netscape Communications Corp.

329% \$7.7M 3,750% \$100M

Netscape credited its growth not to its popular Navigator browser, but to penetrating the global corporate intranet market. Netscape spun off its consumer software products division so it could focus on corporate sales.

PeopleSoft, Inc.

\$115.6M 92% \$14.8M 100%

Demand for PeopleSoft's client/server software remained strong. The company bought Red Pepper Software, a provider of manufacturing and supply-chain management software.

Unisys Corp.

\$1.63B \$14.2M 9%

Unisys continued its transition from a mainframe company to a service provider and reported that 63% of its revenue came from service. Company officials also said that its ClearPath line of enterprise servers was doing well but that product delays will cause ClearPath sales to fall short of earlier

NM=Not meaningful

DEC hits the deck

\$66M loss raises concerns about fundamental weaknesses

By Jaikumar Vijayan

Digital Equipment Corp.'s disastrous quarterly results have prompted some analysts to ask whether the company

is becoming a marginal

Digital last week announced a loss of \$66 million on revenue of \$2.91 billion. That was its lowest quarterly revenue since 1987, and analysts said it underscores the trouble Digital is in.

The weak earnings also put increasing pressure on CEO Robert Palmer, who until recently was hailed for pulling Digital out of a similar situation two years ago.

"Warranted or otherwise, Digital isn't too far from getting a death-spiral kind of image," warned Terry Shannon, editor of "Shannon Knows DEC," a newsletter in Ashland, Mass.

CEO Robert Palmer: Are

his days numbered?

For the short term, at least, Wall Street "has taken a skeptical outlook, partly because we can't isolate how much of Digital's problems are transitionary and how much of it is of a more fundamental nature," said Michael Geran, an analyst at a division of Do-

naldson, Lufkin & Jenrette Securities Corp. in Jersey City, N.J.

Losing mind share

The growing skepticism caused by Digital's financial woes could seriously hurt the company's credibility as a major industry player, observers warned.

For instance, in a recent Computerworld mind share survey that measured which company in-

formation systems managers consider to be their primary supplier, Digital trailed well behind market leaders, including IBM, Hewlett-Packard Co. and Sun Microsystems, Inc.

In fact, respondents ranked Digital seventh in PCs, sixth in workstations and fourth in both the server and World Wide Web server markets

Digital executives last week blamed the latest slowdown on a recent sales force reorganization aimed at boosting direct account coverage. Digital had previously cut back drastically on the direct sales force.



Analysts also pointed to potentially larger problems down the road for Digital. Those include an ominous slowdown in Alpha server sales, a continuing weakness in Europe and a money-losing PC business.

"Digital is wallowing in opprobrium today, but the fact remains that Palmer has done the comeback-kid gig once before. There is no reason why he can't do it again," Shannon said.

Big iron leasing slows IBM down

By Craig Stedman

Mainframe shipments are booming, but IBM's financial results aren't booming along with them.

Although that is partly because of continued price erosion, it also is fueled by a growing tendency among users to lease rather than buy big iron.

Susan Middleton, an analyst at International Data Corp. in Framingham, Mass., said nearly half the air-cooled mainframes being installed by IBM are leased rather than bought, "That's definitely higher than in the old days," when fewer of its water-cooled machines were leased, she added,

IBM's third-quarter numbers came in slightly ahead of Wall Street expectations last week (see chart). But some financial analysts cut their earnings forecasts for the fourth quarter because of several cautionary factors cited by IBM executives, including the trend toward leasing. As a result, analysts said they expect IBM's fourth-quarter results to be good but not superlative.

Leasing cuts into the up-front revenue that IBM gets on mainframe sales because payments are typically spread out over three years. With leasing on the rise, IBM isn't seeing the full benefit of an expected 25% jump in its installed base of mainframe MIPS this year, Chief Financial Officer Richard Tho-

Thomas Loane, vice president of computer and communications serSystem/390s are being upgraded every year, which makes product life cycles too short to justify an outright purchase, Loane said. "A lot of people aren't ready emotionally for the thought of buying something for \$5 million and having it be worth nothing in three years," he said.

Also, IBM Credit Corp. offers aggressive leasing rates and terms to customers who want air-cooled mainframes.

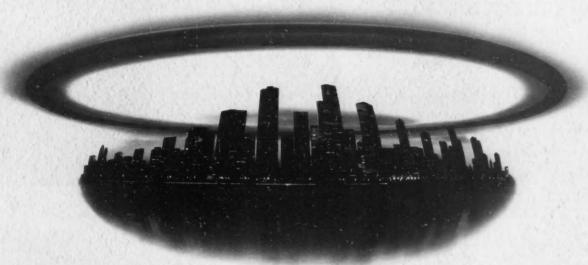
	Q3 1995	Q3 1996	Percentage change
Revenue	\$16.758	\$18.068	7.8%
Income	\$1.3B*	\$1.29B	-1.3%

vices at Alamo Rent A Car, Inc. in Fort Lauderdale, Fla., said leasing is becoming especially appealing as IBM's new air-cooled mainframes start replacing the water-cooled boxes of yore.

The new microprocessor-based

Loane added. Alamo recently signed three-year lease deals on two of IBM's brand-new Enterprise Server G3 systems that will let it upgrade to future models without paying price or interest penalties, he said.

We've got your city surrounded and we mean business.



Sprint's bold deployment of self-healing SONET rings is anything but a cause for alarm-

except for the competition. Because

only Sprint offers four-fiber,

bi-directional, line-switched ring topology throughout its entire domestic network. Which means your mission-critical data is protected to the fullest, automatically rerouted in as little as 50 milliseconds—less than the blink of an eye—even in the event of multiple fiber cuts or equipment failures.

And with speeds at OC-48, we provide virtually unlimited capacity with no bottlenecks or blockages.

Only Sprint

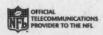
has deployed international SONET ring technology for the highest standard in reliable data transmission.

And now, Sprint's application of broadband metropolitan access networks extends this survivability into

local loops, directly to your offices. This means greater reliability and flexibility, all through a single point of contact. Sprint was not only first to deploy SONET-based rings domestically, but first to build international SONET rings. And since we employed fiber-optic technology from the start, we can continually expand bandwidth over our existing network. What's it all mean? You can count on us, because we mean business.

Call Sprint Business
1.800.588.DATA
www.sprint.com/data1





We help business do more business™

Technology in Government

Clinton promises: Fund basic research in networking technologies. Modernize and streamline telecommunications regulations. Connect all classrooms, libraries and hospitals to the Internet by 2000. **Dole promises:** Encourage businesses to provide computer equipment, training and maintenance support to schools.

CW poll results:* Information superhighway





"Clinton and Gore appear more forward-thinking and capable of understanding the technology. Especially with Gore; I definitely get the impression he is interested in technology, and I don't get that impression with Kemp."

- Lee Nienaber, IS manager, Calvert Group

"The Internet is just an explosive issue, it's going to change our lives, and Clinton seems to get that more."

- Brenda Angle, systems engineer, A. Louis Supply Co.

Encryption Policy

Clinton promises: Loosen controls on the export of encryption products, but retain the requirement that encryption keys be made available to law enforcement. Dole promises: Support legislation to allow the export of any encryption product, without a "key-recovery" scheme – if a comparable product is already available overseas.

CW poll results:*

Support Clinton
Support Dule



"The Republican Congress and Dole have been very good on the encryption issue and have been very supportive of the industry."

- Ken Kay, executive director, Computer Systems Policy Project

"We're losing business to European and South African and Japanese companies because of Ithe key-escrow requirement]. A bank in Germany doesn't want to hear about what the U.S. government has to say [about which products it ean or can't buy]."

 Marc Andreessen, vice president of technology, Netscape Communications Corp.

Research & Development Policy

Clinton: Boost federal funding for research in health care, the environment, information technology and national security. Maintain or strengthen existing federal R&D programs. Support a permanent R&D tax credit.

Dole: Stimulate private-sector investment in R&D via tax cuts, tax incentives and regulatory reform. Eliminate Clinton programs that fund product development.

CW poll results:* Government technology





"There are alarming cuts in the R&D budget [plans] in the out years. In fact, the president's budget is more draconian than the Republican

> - Arvid Larson, chairman of the R&D task force, American Association of Engineering Societies

"The Dole budget plan is vampire economics because it sucks the lifeblood from our nation's future by devastating our science and technology efforts."

- Rep. George Brown (D-Calif,)

Base: 100 IS professionals

Bid to streamline government

By Gary H. Anthes

The Clinton administration hasn't quite "reinvented" government yet, but observers said it is making headway.

"Overall progress of the National Performance Review has been pretty good," said Donald Kettl, director of the Robert La Follette Institute of Public Affairs at the University of Wisconsin in Madison.

Inaugurated three years ago, the National Performance Review (www.npr.gov) was designed to streamline the federal bureaucracy and improve public services. Technology was to play a key role. The program called for wide deployment of networks, online databases and citizen-accessible applications intended to create an "electronic government."

In a recent report to President

Clinton, Vice
President Al
Gore claimed
that by the end of
1999 the program will have
cut the federal
workforce by
273,000 people,
trimmed regulations by 16,000
pages and saved
taxpayers \$118
billion.

As of Sept. 1, improved information technology and other initiatives already had saved \$73 billion out of the expected \$118 billion and eliminated 240,000 positions, he said.

And in a recent report, the

Vice President Al Gore waves to a crowd in Birmingham, Ala., this month, where he was promoting the Family and Medical Leave Act

General Accounting Office said that of 1,203 "action items" in the

IS voters favor Dole

CONTINUED FROM PAGE 1

Observers singled out Vice President Al Gore for the strides he has made in the mammoth "reinventing government" program (see story above).

Despite these gains, Clinton has lost ground in Silicon Valley since 1992 because of his unpopular stand on encryption and weak opposition to abusive shareholder lawsuits.

"I'd say that Clinton is perceived as being no friend of high tech at this point," said Rob Enderle, an analyst at Gartner Group, Inc. in San Jose, Calif.

"By and large, the Clinton administration has done a marvelous job," said Ken Wasch, president of the Software Publishers Association in Washington. He said the Clinton administration works with the software industry far more closely than did the Bush or Reagan administrations.

But even Clinton supporters are quick to note where the White House has fallen short on matters important to the high-tech industry. Often cited is the administration's stand on the unrestricted export of strong encryption prod-



Republican candidate Bob Dole greets the crowd at a campaign rally in Morristown, N.J., early this month

S: AP/WIDE WORLD PHOTOS

praised

original September 1993 National Performance Review report. 380 had been completed as of January this year.

Especially noteworthy, according to Charles Brownstein, executive director of the Cross-Industry Working Team, a coalition of large users and vendors of information technology in Reston, Va., have been the overhaul of information technology procurement regulations and the establishment of electronic services, such as online databases, public bulletin boards and toll-free telephone numbers.

Warren Suss, a government technology consultant and president of Warren Suss Associates in Jenkintown, Pa., hailed progress in developing a nationwide electronic benefits transfer system that will pay out \$110 billion in food stamps and other henefits by 1999

Other accomplishments cited in the vice president's report include the following:

· Two-hundred and fifty technology-driven "reinvention labs." For example, the General Services Administration established the first electronic shopping mall for federal customers. which cut the cost of real estate sales by 50% while generating revenue of \$73 million.

•An interactive service at the Social Security Administration via which citizens can retrieve personal benefits estimates.

· An electronic Federal Information Center and an electronic bulletin board to offer integrated, governmentwide data

But even those who praised the National Performance Review cited some failings.

Suss said the program has had limited success so far in its attempts to link information systems investments to measurable benefits. "But that's a tricky proposition, and the private sector has not solved it any better than the public sector," he said.



President Clinton reaches out to touch a baby during a campaign stop in Wyandotte, Mich., in August

Clinton has techie edge, but other issues override

By Mindy Blodgett and Gary H. Anthes

Information technology professionals believe Bill Clinton is the techie candidate, but it is other issues that have them voting for Bob Dole.

> A recent Computerworld poll of IS professionals showed Dole leading Clinton by 13 percentage points. Respondents said personal philosophy and party affiliation were more important than whether the candidate is sympathetic to technology issues.

> For example, some users who endorse the administration's actions in the technology arena fault its stand on some social issues.

> > High-tech election

feel Clinton

is concerned

technology.

plan to vote

for Dole.

BASE: 100 IS PROFESSIONALS

Essie Williams, a database consultant at Business Information Systems, Inc. in Pittsburgh, expressed concern about some of the administration's actions concerning privacy. He faulted its encryption policies and the antiterrorism act the president recently signed allowing airlines to keep vast databases of information on

Character issue

Character is an important issue for J. T. Mitchell, a senior vice president at Power Conversion Products, Inc. in Crystal Lake, Ill. He said that as a lifelong Republican, he will vote for Dole. "I don't care much for Mr. Clinton," he said. "I just don't think he has any character at all."

"I guess I feel that voting for Clinton and the Democrats is more a vote for idealism and looking forward," said Doug Moran, information systems analyst at CRSS Constructors, Inc. in Boulder, Colo. "I just don't like Dole on social issues.

However, Linda Patent, information systems manager for Caruso International Inc. in Warminster, Pa., said she is voting for Dole because she sees the need for "new blood, a breath of fresh air.

"Even though [Dole] is older, I

@ COMPSTERWORLD

With little more than a week remaining before the presidential election, many high-tech leaders are pushing for Dole and berating Clinton for what they see as a betrayal of their business.

To read this story, and peruse a list of contributors and electionrelated URLs, please visit:

But the character issue and social concerns can cut both ways.

feel that no president should be in office for more than four years," Patent said. "I just think the country needs a change."

But despite the wide support for Dole, some IS professionals said they view Clinton as the lesser of two evils. Lee Nienaber, IS manager at Calvert Group in Bethesda, Md., said he is likely to vote for Clinton. "I guess it's a matter of who will be less detrimental," he said.

Clinton also generated some support from his technology-related positions. Williams said one reason he will support Clinton and Al Gore is that they "have been promoting and touting Internet usage in the schools and in education

Brenda Angle, a systems engineer at A. Louis Supply Co. in Ashtabula, Ohio, agreed that Clinton and Gore give at least the appearance of being more on top of high technology issues.

ucts, which it continues to oppose despite several compromises.

"The Clinton administration ... is on the wrong side of the issue.' said Marc Andreessen, vice president of technology at Netscape Communications Corp. in Mountain View, Calif. Netscape endorsed Dole as a result, he said.

But recently, the White House took a major conciliatory step when it said it would allow, for two years, the export of strong encryption without the unpopular key-escrow feature [CW, Oct. 7].

Legal reform

Industry executives complain most bitterly about Clinton's veto of a bill that would have curbed the frivolous shareholder lawsuits that have especially plagued Silicon Valley.

Dole led an effort in the Senate that overrode Clinton's veto. And in a turnabout some find puzzling, Clinton has joined Dole in opposing a California ballot proposition that would make it easier to sue a company for alleged securities law violations.

Much of the praise Clinton has received is actually directed toward the vice president. Despite an overall preference for Dole, IS professionals polled by Computerworld said they preferred Gore to vice presidential candidate Jack Kemp by a margin of 29%.

"Al Gore's placing the information superhighway on this country's agenda was government al its best," said Michael Maibach, vice president of government affairs at Intel Corp. "It was the government saying, 'We are not going to run this thing, regulate it or tax it, but we ought to pay a lot of attention to it."

Ken Kay, executive director at the Computer Systems Policy Project, a coalition of 13 computer company CEOs, said the administration hasn't been as deficitconscious as it should have been and hasn't worked as closely with industry as it should have in developing research and development policies and programs.

Although Democrats - including Clinton and Gore - tend to be more supportive of government technology programs, the industry complains this administration hasn't done enough to sponsor and fund basic research.

Republicans in Congress reduced funding for programs such as the Commerce Department's Advanced Technology Program, which provides matching grants to industry for basic research, "but the administration has not gone to bat for them very strongly, either," said Arvid Larson, chairman of the research and development task force at the American Association of Engineering Societies in Washington.

Senior editor Kim S. Nash contributed to this report.

(www.computerworld.com) OCTOBER 28, 1996 COMPUTERWORLD

IS wake-up call

No one is campaigning for the "IS vote." But there are such things as IS issues, and IS management should pay attention to them at election time and after.

Microsoft, Oracle, IBM and other vendors are supporting changes in the Uniform Commercial Code (UCC). Pray they never become law. If these amendments take effect, IS costs and legal liabilities will increase. You'll be spending your time negotiating more contracts and playing 'net cop.

One change sounds like an online version of shrinkwrapped software licenses, only worse. Any mail clerk who downloads software from the Internet, after a contract notice flashes on his screen, would legally bind

his company to whatever the contract says. No negotiation, no legal recourse

The result: Companies will have to check on employees to make sure they aren't "signing" contracts

But while the vendors look out for themselves, IS has shown little interest. Only the Society for Information Man-

agement (SIM) and a few large companies appear to be aware of the danger.

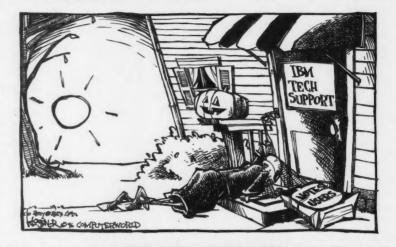
"Vendors are being up-front; it's all on the table. But you don't have to push hard if there is nobody on the other side," says Susan Nycum, an attorney at Baker & McKenzie who watches UCC developments for SIM.

There are other issues. Take deregulation. Do you like increased competition and greater choice? Then wide-open competition in all telecommunications markets is in your best interest. Telecom managers should know which candidates are aggressively pursuing deregulation and which aren't. Ask the candidates via their Web sites: www.dolekemp96.com and www.cg96.org.

Are you a security-minded IS manager in a multinational company? Then you should support lessrestrictive export policies on encryption technology. If Uncle Sam opens the door to more exports, IS managers can help their overseas users and ensure interoperability with domestic encryption standards.

IS executives and associations must watch and sound the alarm when their companies' interests are at stake. Otherwise, that great sucking sound might be coming from your budget.

Allan E. Alter, Senior editor, Managing Internet: allan_alter@cv.com



It's been the Queen's English for more than 40 years



As an editor, I appreciate Kenneth Hobbs' comments or "The King's English, please" [Letters to the editor, CW, Sept. 2]. On the whole, I think Computerworld is an effective communication tool, and I rely on it to keep up with

The only thing I would point out in Mr. Hobbs' letter is the heading you gave it. Unless I am mistaken and Her Majesty Elizabeth II has passed away, your heading ould read "The Queen's English, please." Save The King's English for Charles.





No problem getting Wisdom of temps NT 4.0 in Canada

I'm writing in regard to Mike Neal's letter to the editor ["Foolish thoughts," CW, Aug. 26]. Neal had visited an Egghead Software store and asked when it would have Windows NT 4.0 in stock. He was told Egghead wouldn't get Windows NT 4.0 until October, and the clerk added, "You're a fool to believe anything Microsoft says [about release dates]."

I live in Canada and purchased NT 4.0 Workstation and NT 4.0 Server off the shelf in a small software store during the first week of September. They had lots in stock. I suggest that the problem might be with that Egghead clerk's attitude toward selling Microsoft products.

It certainly has nothing to do with actual release dates and supply.

Vince Mullan Chevron Canada Resources Calgary, Alberta

I found the "I am a temp" article [CW, Sept. 16] an exceptionally fine one. It should probably be made available on a recurring basis to every consultant and manager in the world. There are many other "been there, done that, got the T-shirt" professionals scattered throughout the industry whose thoughts would be beneficially published.

Michael G. Jones Palm Harbor, Fla. cherev@ibm.net

Attractive option to Intel available

Your article "NT workstations nip at Unix heels" [CW, Aug. 26] had some useful information but painted a black-and-white picture of the workstation world. Most software developers will tell you that the Intel x86 architecture has been a well-beaten

dead horse since the 80286.

Newbies to the workstation realm who anticipate heavy NT use have a more attractive option than your Intel bias suggests. From the early days of NT, Microsoft has worked feverishly to produce the 64-bit version of Windows, which runs on Digital's Alpha processors. In fact, Alpha-based workstations that run up to 500 MHz can still give PC vendors a run for their money.

I suggest PC buyers consider their alternatives before they return to perpetuating the poor engineering that has plagued the computer industry for nearly 15 years.

I. Aaron Holmes Pullman, Wash

Computerworld welcomes comments from its readers. Letters shouldn't exceed 200 words and should be addressed to Maryfran Johnson, Executive Editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax number: (508) 875-8931; Internet: letters@cw.com. Please include an address and phone number for verification.

SOON, THERE WILL BE TWO

KINDS OF COMPANIES.

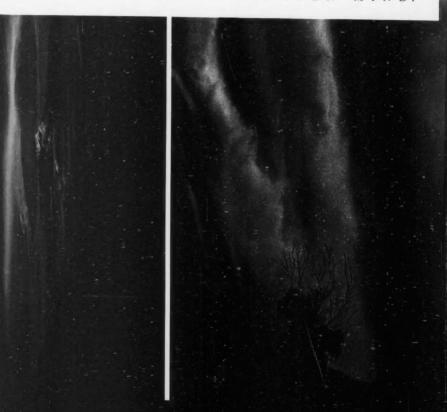
THOSE WHO HAVE ACCESS

AND THOSE WHO SEARCH FOR IT.



INTRODUCING DISTRIBUTED

OPEN SYSTEM AND AN OPEN MIND.







These days, you hear a lot of companies talk about open system computing philosophies, and while Compaq was one of the early pioneers, we believe that it's time to take a big step farther.

a c c e s s To an open business philosophy. A philosophy that begins with something we call Distributed Access.

Distributed Access is not a canned solution. It's not a new piece of hardware or software or a sales force. It's an idea literally based in decentralized network computing environments and figuratively

ACCESS. THE DIFFERENCE BETWEEN AN

based in distributing access to the people who need it. It's a new model of computing that offers the control of traditional legacy systems and the added flexibility and freedom to help you connect people to people and people to information.

How can we do that? By taking the time to understand not just your computing needs today, but the direction of your entire company. Knowing where you want to go and how you want to get there. But most of all, by knowing that what's truly important isn't computers or computing, it's information.

Finding it. Shaping it. Protecting it. Distributing it. Across the hall or across the globe. If information is the engine that runs today's successful businesses, Distributed Access is the fuel.

Our goal is to make information flow faster, farther, better.

When the information that you need, anywhere in your company, anywhere in the world, is as easy to access as the evening news, we'll consider that a job well done.

And a benchmark to beat.

WE DON'T CLAIM TO HAVE ALL THE AN

JUST THE PARTNERSHIPS TO FINI

distributed



Can one company make an idea like Distributed Access a reality? Yes, if that company doesn't think like one company.

a c c e s s If that company jettisons the one-stop-shopping, "we can do it all" mentality. If that one company keeps an open mind.

In the world of Distributed Access, an open mind is one that is ready and willing to embrace better ideas, no matter where they come from.

At Compaq, we work with Microsoft, Novell, SAP, EDS, Oracle and Intel every day, day in and day out, to make sure that you not only get best-of-breed solutions, but the right best-of-breed solutions. Solutions like that don't happen by phone or fax or by getting together in Las Vegas for a few days. They happen when people roll up their sleeves and work together.

Which is why we have engineers that actually live in Redmond, Washington, constantly testing and improving the performance of Compaq servers running Windows NT.* Microsoft, on the other hand, tests products like Microsoft Exchange Server* and Microsoft SQL Server* using Compaq servers as their lab.

Our Integration Management solution allows you to integrate Insight Manager with the likes of BMC, Cabletron and Seagate.

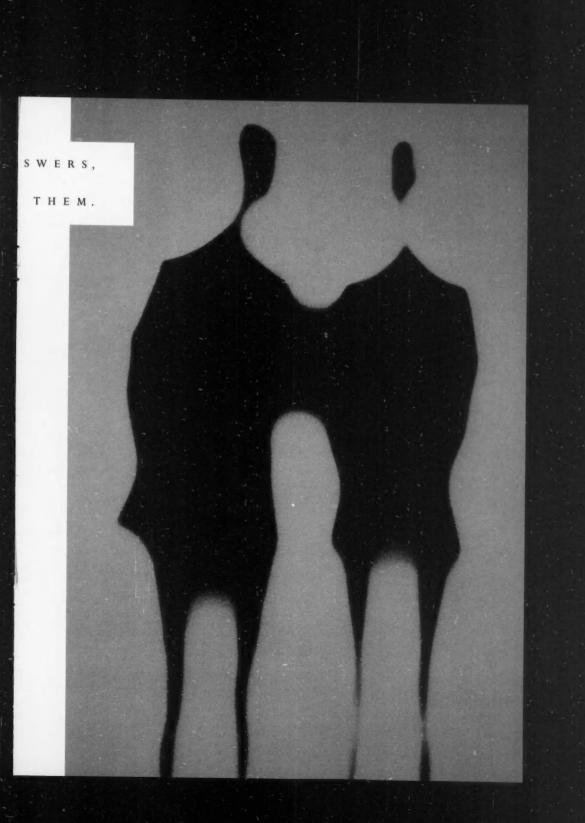
Compaq's partnerships with the brightest people in the technology world mean that we see new ideas sooner and, as you might expect, we're able to incorporate them into your business sooner.

The same goes for potential problems. We'll be the first to know and the first to fix the problem. Which means you'll be the last to get burned.

To put it bluntly, when it comes to Distributed Access, partnerships are not considered smart public relations. They are considered the cornerstone of the way we do business.

They keep us one (maybe two) steps ahead of our competition.

And we believe they can do the same for you.



NOW THAT WE'RE

0 0

THE WORLD

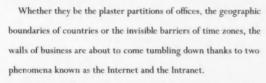
0

0



ALL HERE,

TO BUSINESS.



Through Distributed Access, we intend to not simply help this happen, but to make it happen.

The fact is, Compaq's philosophy—the ongoing establishment of industry standards and development partnerships—perfectly mirrors the foundation upon which the Internet has been based.

distributed



The way we see it, the Internet is not just about reaching out, it's about reaching in. Which is why we've entered into partnerships with the likes of Microsoft, Cisco, BMC Software and Intel to establish Web-based enterprise management tools.

Soon, you will be able to manage complex networks

using any Web browser. In other words, reducing both the complexity and cost of systems management by using Internet technologies to solve old problems in new and better ways.

Over the years, a lot of people have talked about the coming of the information superhighway. The fact of the matter is, it's not coming, it's here. It's called the Internet.

Distributed Access can make sure you and your business are drivers, not just passengers.

COMPAQ

Has It Changed Your Life Yet?

© 1996. Compaq Computer Corporation, All rights reserved. Compaq registered U.S. Patent and Trademark Office, Distributed Access, Integration Management, Implig Managers, SmartStart and Compaq, Commoder are registered trademarks of Compaq, Computer Corporation, All other brands and products sames our techniques for registered trademarks of their respective companies. For more information about

Bill Clinton

High-tech R&D, schools are top priorities

n wiring schools:

I have set a goal of connecting every classroom, library, hospital and clinic to the information superhighway by 2000. If the private sector and government work together, we can ensure that all of our children are able to use PCs and the Internet to access the information they need. Our students must learn the job skills they will need to prosper in the digital age.

Vice President Al Gore and I have visited more than half a dozen schools to highlight the importance of educational technology, including participation in the Net Day "electronic barn raising."

I have also called on the Federal Communications Commission and state regulators to give every school and library in the country the lowest possible "E-rate," or education rate, including free basic service to the Internet.

On encryption policy:

There are no controls on the domestic manufacture and use of encryption. But because encryption can be used by criminals and terrorists to thwart wiretaps and hide their actions, the U.S. has controlled exports of the strongest forms of encryption.

We have worked with industry to loosen restrictions on the export of encryption so that Americans will be able to better protect their data and communications and American companies can meet their foreign customers' demands for stronger encryption.

On Oct. 1, my administration announced that it would allow companies to export encryption products and services using Data Encryption Standard (DES) and equivalent algorithms for the next two years, provided they work with the government to develop "key-recovery" encryption products. That would enable the government to decode encrypted data if legally authorized. Such key-recovery products will provide even stronger protection than DES, without posing a threat to public safety and national security.

On high-tech research and development:

My administration has made investment in R&D a top priority, especially for information technology. For instance, we have strengthened the High Performance Computing and Communications Initiative, which then-Sen. Gore helped launch in 1991. And we have expanded the Advanced Technology Program at the Department of Commerce, which provides matching grants to

companies so they can turn good ideas into new technologies.

The administration believes that the federal R&D tax credit is an effective way to spur investment in research, and we will continue to urge Congress to make the credit permanent.

On privacy:

If not properly addressed, concerns about privacy could be a major roadblock in the information superhighway. That is why last year my administration published a report defining "privacy principles" for the use of personal electronic data. These guidelines would ensure that the public and private sectors don't abuse electronic information about individuals. They would ensure that individuals could control what kind of information is being collected about them and how it is being used.

The administration is exploring how we can better address online privacy concerns and whether there is a need for additional staff and resources to be devoted to this problem.

This column is based on written responses from the Clinton/Gore '96 campaign (www.cg96.org) to a Computerworld questionnaire.



Encryption controls hurt 'net commerce

n wiring schools:

Instead of throwing billions of dollars worth of computers and connections at schools that aren't able to handle the technology, the Dole administration will encourage American companies to "adopt" public schools, particularly those in inner cities. The companies will provide the schools with computer equipment that becomes available when the companies upgrade their computer systems. The companies would also provide maintenance and support, as well as show teachers how best to use computers.

The taxpayers shouldn't pay for new computers that have capabilities — and costs — beyond what the schools really need.

On encryption policy:

The Clinton/Gore encryption policy has been a major roadblock for electronic commerce. One of Clinton's first acts as president was to announce the Clipper encryption plan, which was soundly condemned by the computer science community. Americans simply don't trust government enough to give it the keys to their private information.

The announcement also advertised to criminals that the way to protect their information from law enforcement is through encryption, something many had never heard of until the Clinton announcement.

Vice President Gore's recent announcement of

"Clipper III" shows that the current administration still doesn't understand how it is hurting electronic commerce and security and encouraging foreign companies to move into an important market.

I cosponsored the Pro-Code bill, which recognizes today's realities about encryption and will allow American companies to market products that will keep vandals out of our computer systems. Encryption is already available to anyone who wants to use it, and the Clinton/Gore restrictions place American software producers at a competitive disadvantage in the world market.

On high-tech research and development:

The Dole/Kemp tax cuts will put more money in the hands of Americans to invest in companies whose R&D efforts make them attractive. Capital gains tax relief will reward investors who have taken the risk with their own money to build America's high-tech industries. The larger question of whether the R&D tax credit should be made permanent will be decided in the context of overall tax reform.

I have been a strong supporter of federally funded basic research, but the federal government shouldn't be a venture capitalist. Clinton's programs to fund product development are failures and must be eliminated. American venture capitalists are knowledgeable and realistic about their investments and are staking their own money on their judgment. Why would anyone believe that a Washington bureaucrat could do the job better?

On privacy:

The Clinton/Gore administration has restricted the best way to prevent many privacy abuses: strong encryption that prevents monitoring of online activities and makes computer break-ins unproductive.

As a co-sponsor of the Pro-Code bill, I recognize the importance of a realistic policy toward encryption to protect privacy. The solution isn't stronger federal laws, but allowing people to protect their own information.

People also need to be informed when personal information about them is included in a database, so they can review it for inaccuracies. They should be informed when personal information about them is transferred from one government agency to another.

This column is based on written responses from the Dole/Kemp '96 campaign (www.dolekemp96.org) to a Computerworld questionnaire.



We're working

with industry

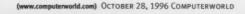
export controls

on encryption

to loosen

products.

Washington bureaucrats don't make good venture capitalists for high-tech industries.



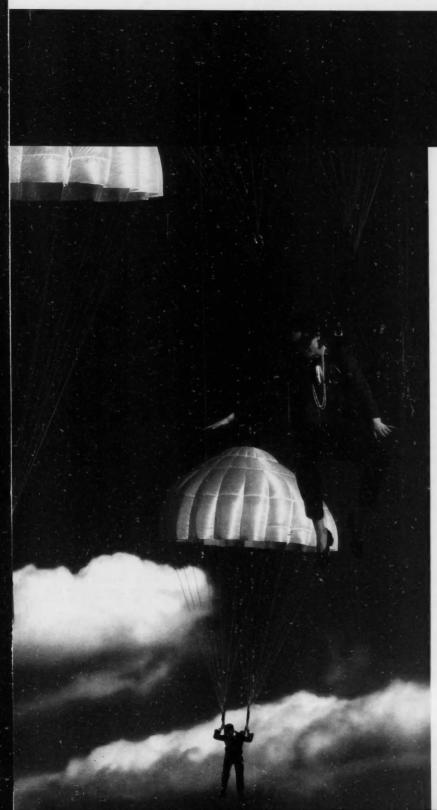
THERE'S A
REASON WHY FIVE
OF THE BIG SIX
ACCOUNTING
FIRMS BUY DELL.







3Com





"Risk" is hardly an accountant's favorite word. So for our Big Six customers to invest more than \$56 million in Dell PCs over the past 12 months, they had to feel that it was an incredibly safe move. Here's why.

For one thing, we're the #2 PC supplier to large and medium businesses, so the computers we build are built for business. They're custom-built, in fact, in ISO 9002 certified facilities to give our customers the power of industrial-strength computing. And they're built with industry-standard parts, instead of proprietary ones, and backed with a guarantee of network compatibility.

For another, we really understand how to work with big business. We know that keeping our machines up and running isn't just an imperative, it's mission-critical. Which is why we deploy a nationwide army of local account executives and systems engineers into the field each and every day.

How did wa get all this first-hand knowledge of our customers? By staying in touch with our customers at every turn, from selling directly to them to answering the phones when they call for service. A way of doing business that 6 of the 8 biggest airlines, 12 of the 13 largest telecommunications companies, 4 of the 5 largest mutual insurance companies — in fact, 80% of the Fortune 500 — wouldn't have any other way.

So if you're looking for a computer company that really understands big business, Dell's the place to land.

DELL 800-879-8813

http://www.dell.com

Mon-Fri 7am-9pm CT • Sat 10am-6pm CT • Sun 12pm-5pm In Canada* call 800-839-0148

Keycode #12113

The Intel Inside logo and Pentium are registered liamemarks of Intel Corporation. Microsoft, Window, and the Windows NT logo are registered trademarks of Microsoft Corporation. The 3Gom Retwort Ready logonia a trademark of 5Gom Corporation. (8) 1956 Dell Computer Corporation. All indiffs reserved.

Notes is fine, IBM service isn't

When IBM spent \$3.5 billion to buy Lotus in July 1995, the conventional wisdom was that Lotus could only benefit from IBM's vast sales and service capabilities. On the other hand, there was widespread fear that

IBM's bureaucratic culture would bog down product development at a time when Notes faced fundamental challenges from Microsoft and Internet-based alternatives.

A recent Computerworld survey of 150

large and midsize IS customers who use Lotus Notes and have an IBM mainframe or AS/400 system indicates that both of these assessments have turned out to be By large margins, customers are satisfied with Notes and confident that Lotus is on the right track.

Some 75% of the respondents said Lotus is doing a good job integrating Notes with the World Wide Web. Three-quarters of the respondents also predicted the Internet won't endanger the overall Notes business. Customer interest in the Domino Web server and the upcoming Release 4.5 is high. If anything, IBM and Lotus should be doing more to market their strong product story.

Are they being served?

IBM's contribution in the sales and service arena has been a disappointment. Customers who say the quality of Notes service has declined since the acquisition outnumber those who say it has improved, by nearly a 4-1 margin. That's a huge difference for this type of question.

David Moschella



IBM was supposed to give Lotus Notes users great service. It hasn't.

The data is remarkably consistent across key service dimensions, including the quality of support and sales personnel, reliability and overall customer service.

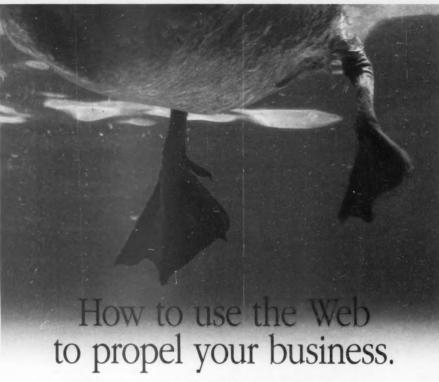
This poor performance is doubly troubling because Notes represents the essence of the reliable, secure, networkcentric enterprise strategy Louis V. Gerstner has adopted.

Outside of the data center, Notes is really the only IBM product that is a clear industry leader; it is still IBM's best chance to stop many of its customers from becoming virtually all-Microsoft shops.

Given this, Notes customers should be getting the best service IBM has to offer. If IBM can fall down in such a high-profile area, it has to make one wonder about its other commitments, especially after the Olympics fiasco. This is bad news for a company that has increasingly focused on its services business.

Now, for unrelated reasons, the Lotus executive team has been reshuffled; Jeff Papows is president and Deborah Besemer has taken over worldwide sales and services. But because many of the problems are on the IBM side of the house, IBM executives John Thompson and Ned Lautenbach are really the ones responsible for assuring that this year's poor customer service record was only a temporary lapse.

Moschella is senior vice president of research at Computerworld, Inc. His Internet address is david_moschella@cw.com.



AT&T Easy World Wide Web": we provide the power, you pick the direction.

AT&T Easy World Wide Web offers an easy, friendly way to put your best foot forward on the internet.

One stop shopping for a global Internet presence

Thanks to our experience in building superior network infrastructures, AT&T Easy World Wide Web offers you a hassle-free, end-to-end solution – from implementing to managing your Web site.

To help you dive right in, we provide leading edge Web site creation tools and access to training. And our secure staging allows you to preview and perfect your site before it's out there for the world to see. Even if you've already established your site, you may find that outsourcing with AT&T Easy World Wide Web is a more cost-efficient option.

The network reliability you expect from AT&T

To keep your business moving forward on the 'Net, we protect your site from becoming overloaded and obsolete. Our 'bandwidth on demand' means less frustration for your visitors – whether that is 50 people one day or

50,000 the next. Our operation is fully redundant, so we always have backup and the ability to add capacity.

Propel your business with a leader in electronic solutions.

AT&T Easy World Wide Web is one of the many Internet products we offer. As your Internet needs expand, AT&T can move you upstream with additional enhancements.

For more information on AT&T Easy World Wide Web call toll-free 1 800 7HOSTIN, Dept. 1027

Or e-mail us at telemark@attmail.com Or visit our Web site at bttp://www.att.com/easycommerce/

© 1996 AT&T All rights reserved.



Latitude Notebook

OptiPlex Desktop



DELL LATITUDE XP/ CD P150ST

NEW 150MHz PENTIUM PROCESSOR

• 12.1" SVGA Active Matrix

Integrated 6X CD-ROM Drive

• 45MB RAM/2.1GB Removable

· Smart Lithium Ion Battery with

· PCI Bus Architecture with

Integrated Four Speaker

. Infrared Ports (IrDA 1.1)

· Leather Carrying Case

• 3 Year Limited Warranty

DELL OPTIPLEX GX pro 180

• 64MB EDO ECC DIMM RAM

2GB FIDE Hard Drive

. EX FIDE CD-ROM

Video Memory

3 Year Warranty

 256KB Internal L2 Cache • 17LS Monitor (15.7 v.i.s., .28NI)

• Integrated Vibra 16 Audio

NEW Tool-less Convertible

Desktop/Mini Tower Chassis

180MHz PENTIUM PRO PROCESSOR

. S3 Trio 64V Video Card with 2MB

. Integrated 3Com PCI EtherLink III

• Optical Trackball

• 28 8 X IACK Cabled Modern

256KB L2 Cache

16-bit Sound

Advanced Power Management®

• 128-bit High Performance Video

Color Display

Hard Drive

133MHz PENTIUM® PROCESSOR

- 12.1° SVGA Active Matrix Color Display
- 40MB RAM/1.3GB Upgradeable Hard Drive
- 3.5" Floppy (both included) or Optional 2nd Li-lon Battery
- 256KB L2 Cache
- Stereo Speakers
- Controller with Integrated Video RAM
- 28.8 XJACK® Cabled Modem
- · Leather Carrying Case
- 3 Year Limited Warranty¹

DELL LATITUDE XP/ P133ST 133MHz PENTIUM PROCESSOR

- 11.3" SVGA Active Matrix Color Display
- 40MB RAM/2.1GB Removable Hard Drive
- . Smart Lithium Inn Rattery with Advanced Power Management
- · PCI Bus Architecture with 256KB12 Cache
- · Integrated 16-bit Sound
- 128-bit High Performance Video Controller with Integrated Video RAM 16-bit Sound
- Infrared Port (IrDA 1.0)
- 28.8 XJACK Cabled Modem
- Leather Carrying Case · Optical Trackball
- 3 Year Limited Warranty PICTURED SYSTEM

DELL OPTIPLEX GX pro 180

. 32MB EDO ECC DIMM RAM

• 2GB EIDE Hard Drive

. 8X FIDE CD-ROM

Video Memory

256KB Internal L2 Cache

• Integrated Vibra 16 Audio

• NEW Tool-less Convertible

Desktop/Mini Tower Chassis

180MHz PENTILIM PRO PROCESSOR

• 17LS Monitor (15.7 v.i.s., .28NI)

. S3 Trio 64V Video Card with 2MB

Integrated 3Com PCI EtherLink III

DELL LATITUDE XP/ CD P150ST NEW 150MHz PENTIUM PROCESSOR

- 12.1" SVGA Active Matrix Color Display
- Integrated 6X CD-ROM Drive
- 16MB RAM/810MB Removable Hard Drive
- . Smart Lithium Ion Battery with
- Advanced Power Management®
- PCI Bus Architecture with 256KB L2 Cache
- Integrated Four Speaker • 128-bit High Performance Video
- Controller with Integrated Video RAM Controller with Integrated Video RAM
- Infrared Ports (IrDA 1.1)
- 28 8 X IACK Cabled Modem
- · Leather Carrying Case
- Microsoft[®] Office 95
- · Optical Trackball

3 Year Limited Warranty

DELL OPTIPLEX GX pro 180 180MHz PENTIUM PRO PROCESSOR

- 32MB EDO ECC DIMM RAM
- 3GB EIDE Hard Drive
- 256KB Internal L2 Cache
- 15LS Monitor (13.7 v.i.s., .28NI)
- · 8X FIDE CO-ROM
- . S3 Trio 64V Video Card with 2MB Video Memory
- Integrated Vibra 16 Audio
- Integrated 3Com PCI EtherLink III

- · NEW Tool-less Convertible Desktop/Mini Tower Chassis

DELL POWEREDGE XE 5166

166MHz PENTIUM PROCESSOR

512KB Write Back L2 Cache

(Expandable to Qual Processor)

• 128MB Parity Memory

SCSI-2 Controller

Hard Drives

Integrated NCR 810 Fast

Two 4GB 7200 Fast SCSI-2

• Intel Pro 100 PCI Ethernet Adapter

• 8X SCSI CD-ROM Drive

- . MS Office Pro v7.0
- 3 Year Warranty

Product Code: 300352

- SafeSite Server Management System
- Includes Windows NT Server
- 1 Year DirectLine NOS Support
- 3 Year Warranty including 1 Year
- NBD On-site Service
- 7 x 24 Dedicated Server Hardware **Technical Support**

Product Code: 200153



- . Options Bay accepts 6X CD-ROM,
- · Smart Lithium Ion Battery - PCI Bus Architecture with
- . Integrated 16-bit Sound with
- 128-bit High Performance Video
- . Infrared Port (IrDA 1.0)

DELL OPTIPLEX® GX pro 180 180MHz PENTIUM PRO PROCESSOR

- 32MB EDO ECC DIMM RAM
- . 1GB FIDE Hard Drive
- 256KB Internal L2 Cache • 15LS Monitor (13.7 v.i.s., .28NI)
- 8X FIDE CD-ROM
- . S3 Trio 64V Video Card with 2MB Video Memory
- Integrated Vibra 16 Audio
- Integrated 3Com® PCI EtherLink® III
- Windows NT* 4.0 with 1 Year Support Windows NT 4.0 with 1 Year Support Windows NT 4.0 with 1 Year Support
- · NEW Tool-less Convertible Desktop/Mini Tower Chassis
- . MS° Office Pro v7.0
- 3 Year Warranty¹

Product Code: 300317

DELL POWEREDGE® SP 5166

- 166MHz PENTIUM PROCESSOR
- 512KB Write Back L2 Cache
- 64MB Parity Memory . Integrated NCR 810 Fast SCSI-2 Controller
- 4GB 7200 Fast SCSI-2 Hard Drive
- 8X SCSI CD-ROM Drive • Intel® Pro 100 PCI Ethernet Adapter
- SafeSite[™] Server Management System

• 3 Year Warranty

Product Code: 300316

- · Includes Windows NT Server
- . 1 Year DirectLine™ NOS Support
- 3 Year Warranty¹ including 1 Year NBD On-site^A Service
- 7 x 24 Dedicated Server Hardware Technical Support

PICTURED SYSTEM







PowerEdge Server



3Com

ilies, please write to Dell LIEB L.P., 2214 W. Bulker Lane, Suite D. Austin, TX 78258. *Prices and sp U.S. sals, and subject to change without notice. "On-eith Service provided by Digital Equipment Corporation and is available in 29 netropolition areas. For more information cell Birth Birthia ⁵⁰⁰ line at 1400-550-1329. "Comp. Effectivit and Final Birthia Service information and file 3. "Clim Birthia Service information and file 3. "Clim Birthia Service information and file 3. "Clim Birthia Service information and Final Birthia Service informati ations Corporation, BusinessCare and DirectLine are registered any marks of Dell Computer Corporation. @ 355 Bell Computer Corporation. All rights are registered any marks of Dell Computer Corporation.



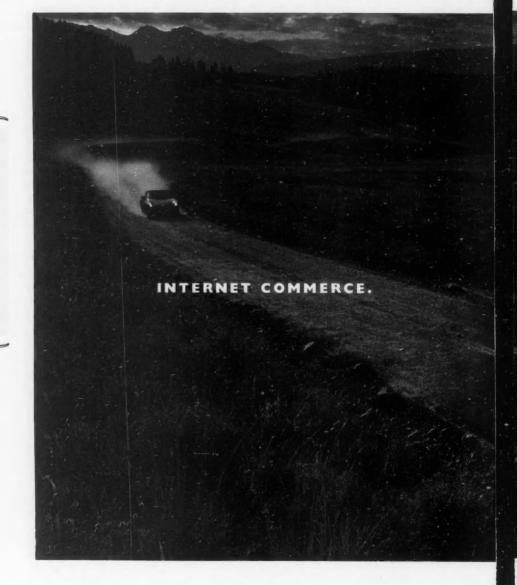
Companies who have selected Open Market to belp them lead the way in Internet Commerce:

Bank One

First Union National Bank

Time Warner's Pathfinder

Tribune Company



WHY IS OPEN MARKET THE ONLY COMPANY THAT HAS PAVED THE WAY TO INTERNET COMMERCE? OUR GOAL FROM DAY ONE WAS TO DEVELOP

COMMERCE SOFTWARE FOR THE INTERNET. AND UNLIKE OTHER COMPANIES, OUR SOFTWARE IS AVAILABLE TODAY. IN FACT, SOME OF THE WORLD'S MOST

WHAT WE'VE DONE TO IT.

SUCCESSFUL COMPANIES ARE ALREADY USING OUR SECURE, SCALABLE INTERNET COMMERCE SOLUTIONS TO DO BUSINESS WITH OTHER COMPANIES AND CONSUMERS. WITH THESE SOLUTIONS, LARGER COMPANIES CAN MANAGE NOT ONLY PAYMENT PROCESSING BUT EVERY ASPECT OF INTERNET BUSINESS TRANSACTIONS. AND SMALLER COMPANIES CAN REAP THE BENEFITS OF INTERNET COMMERCE WHILE OUTSOURCING THE COMPLEXITY, ALLOWING THEM TO FOCUS ON WHAT THEY DO BEST. IN SHORT, OPEN MARKET FITS YOUR NEEDS NO MATTER WHAT SIZE YOU ARE.

TO FIND A SMOOTH ROAD TO YOUR OWN INTERNET COMMERCE SOLUTION, VISIT OUR WEBSITE AT WWW.OPENMARKET.COM/ROAD OR CALL 1-888-OPEN-MKT.

Open Market 245 First Street Cambridge, MA 02142



We ARE Internet Commerce.

The NCR Scalable Data Warehouse.

NCR unveils record-setting computer using Teradata

At the announcement

Vte data Warehouse age-system maker recently more Orm

NCR debuts mammoth EMC, NCR to Demonstrate Largest Data Warehouse greenents high-end storage units Esc.

Sold to MCR are valued at over 514

Sold to the demonstration, and the demonstration, and the demonstration.

The based less has connected the formation of the demonstration. hased New January Connected and

By a WALL STRUCK, MASS, WILL UNVEIL WHAT IS AND IN THE WORLD OF THE WORLD STRUCK, MASS, WILL UNVEIL WHAT IS AND IN THE WORLD STRUCK, OF ILL WHAT IS AND INTO THE WORLD STRUCK, OF INTO THE TOO THE WORLD STRUCK, OF INTO THE WORLD STR based New Has configuration to the database, accurate the tions to the uniduate, Repetitude of transactions data was Reservoises containing 11 terrabytes of 11

Reservoises of information as a known section bytes of which self is open-system

Tre product which self is open-system

Tokyo, storage product.

Tokyo, storage product.

Try 2500 by N.C.R. 2 unit of the computer self a powerful of the comput

Only we can make news this big.

IN DATA WAREHOUSING

Once again, NCR is leading the way in data warehousing, Using NCR's robust Teradata® database and EMC" intelligent storage, coupled with our highly scalable

WorldMark" servers, we built the world's first data warehouse large enough to handle 11 terabytes of data. Or 2.75 billion pages of text.



NCR's WorldMark servers with EMC's Symmetrix® storage allow you to turn mountains of raw data into useful information with unprecedented speed, giving you unmatched querying capabilities. And only WorldMark servers offer you a platform that scales from SMP to clusters, to MPP, allowing you to start your data warehouse small and grow it to any size.

To get more information about NCR's scalable data warehouse, call 1800 CALL-NCR, ext. 3000. Or experience our data warehousing capabilities firsthand at: http://www.ncr.com. Or visit http://www.emc.com







Apple eyes mobile users | Gartner: Performance

Niche products emerge from restructured division

By Lisa Picarille

Apple Computer, Inc. this week will take the wraps off two sub-\$1,000 mobile computers: a portable computer that targets educators and a new version of its Newton handheld device for mobile professionals and medical workers.

The EMate 300 and the MessagePad 2000 are the first products to come out of Apple's Information Appliance Division, which was formed in May during a companywide restructuring [CW, May 20].

An updated version of Apple's Newton personal digital assistant (PDA), the MessagePad 2000 is aimed at mobile business professionals. Due in the first quarter of next year, it features a new, higherperformance processor, a larger screen, improved battery life for 24 hours of continuous use and built-in productivity and communications software

The device uses the latest Apple Newton operating system, Version 2.1, and is based on Advanced RISC Machines Ltd.'s Strong-ARM SA-110 RISC processor that runs at 161.9 MHz. Users also get a word processor, spreadsheet, personal information manager, World Wide Web browser and electronic-mail software (see chart).

James Staten, an analyst at Dataquest, a market research firm in San Jose, Calif., applauded Apple's move to increase the size of the Newton's screen to 4 by 8 in., half the size of a standard PC monitor.

Despite the improvements, the Message-Pad 2000 may still have limited appeal. Only 480,000 handheld devices were sold worldwide last year, according to Data-

Apple, page 43

clusters aren't needed

Key server platform

next five years include:

PERFORMANCE AND SCALABILITY

The system will need to

support more than 500

OLTP users

HIGH AVAILABILITY

At least 99% uptime

SOFTWARE AVAILABILTY

Packaged vertical-industry

applications: leading-edge development tools

SERVICE AND SUPPORT

Worldwide service and

support

ce: Gartner Group, Inc., Stamford, Conn

entiators during the

By Jaikumar Vijayan

espite vendor efforts to push clustering and massively parallel server systems, symmetrical multipro-Five-year server plan

cessing (SMP) will meet most performance requirements over the next five

In fact, users might resist the highly scalable systems because they are seen as overkill and confusing to implement, according to a recent report by Gartner Group, Inc. in Stamford, Conn.

"Vendors are promoting different types of clustering technologies as the best, most scalable way of doing things. But most users are not going to need scalability beyond what SMP offers," said Joe Barkan, an analyst at Gartner.

"Besides, SMP is a known technology; it makes things relatively simple, and you

have the ability to scale pretty far with it." Barkan added.

As a result, only 10% of applications will require the kind of performance scalability offered by cluster and massively parallel

processor server implementations over the next few years, according to the Gartner report.

Although clustering will continue to be touted by vendors, it probably will be only the third-best approach to performance scaling, behind SMP and Non-Uniform Memory Access architecture, Gartner said

At the same time, Unix and Windows NT clusters will continue to be attractive options for systems availability, the report said.

"Performance the only measure. How long a system can stay un is also quite critical" in making im-

plementation decisions, said Ionathan Eunice, president of Illuminata, Inc., a

Gartner, page 42

Portable prospects

MESSAGEPAD 2000 Operating system: Newton Version 2.1

Processor: 161.9-MHz StrongARM SA110 Weight: Just more than

1 pound RAM: 5M bytes Slots: 2PCMCIA Keyboard: Included

Price: Expected to be less than \$1,000

EMATE 300

Web browser, E-mail, spreadsheet, word processor, drawing program, graphing calculator. address book, notepad, calendar, database, science and math programs

Built in

th: 4 pounds Price: Less than \$800

SUDDENLY, EUROPEAN STANDARDS ARE A GORGEOUS NECESSITY.

If your require a 17" monitor for your media-intensive applications, don't just settle for a bigger system. Acquire a better one. A media-ready Nokia 447X.

These are the first monitors in the world to achieve the new

VESA standards for display clarity. Their spacious 15.7° viewing area boasts an aperture grill of .25 mm and refresh rates of 150 Hz. They are capable of 1600 x 1200 resolution, which translates directly to improved working

conditions and user-sensitivity. They are also the first to be TCO-95 certified for greatly reduced screen emissions.

What's more, dual-powered stereo speakers in front combine with a subwoofer in the swivel/tilt base to project audio that is properly shaped and sensational. Combined with its standard in-bezel microphone, the media-ready series enables a complete convergence of computing and communications, which makes the new 447X series a necessity for anyone making full use of their computer.

To meet today's standards, work with the people who

Visit us at www.nokia-americas.com or call 1.800.BY. NOKIA and ask for Dept. N212.





















Gartner: SMP fills performance need

CONTINUED FROM PAGE 41

consultancy in Nashua, N.H.

"Basically, what users are looking for is a mix of scalability and availability," Eunice said. As far as application availability requirements are concerned, clustering is probably the best option, he added.

Redundant protection

In clustering, several servers are tied together to appear as one system to applications and users. That provides hardware redundancy and scalability.

By comparison, SMP boxes run multiple jobs simultaneously on different processors, which reduces programming complexity and opens the servers up to packaged applications.

Whereas SMP puts multiple processors together in one system enclosure, clustering puts them together in multiple system enclosures.

"We have looked at SMP as providing the scalability needed for performance," said Ratan Bahavnani, director of software development at Autologic Information International, Inc., a manufacturer of customized systems for the publishing industry in Thousand Oaks, Calif.

Clusters provide the needed failover capabilities, "but we don't see clusters sharing the workload effectively just yet," Bahaynani said. Autologic has been using SMP systems to develop some of its compute-intensive raster image processing applications for publishers. By using SMP servers, it has reduced processing times from more than an hour to just less than a minute for some applications.

According to the Gartner report, Unix systems will continue to outscale Windows NT systems during the next five years or so, despite rapid gains by the Wintel camp.

However, Windows NT will scale well enough to meet most database and application server requirements as early as 1998. Ongoing support and maintenance cost will also continue to favor NT implementations over Unix, according to Gartner.

Clustered Solaris

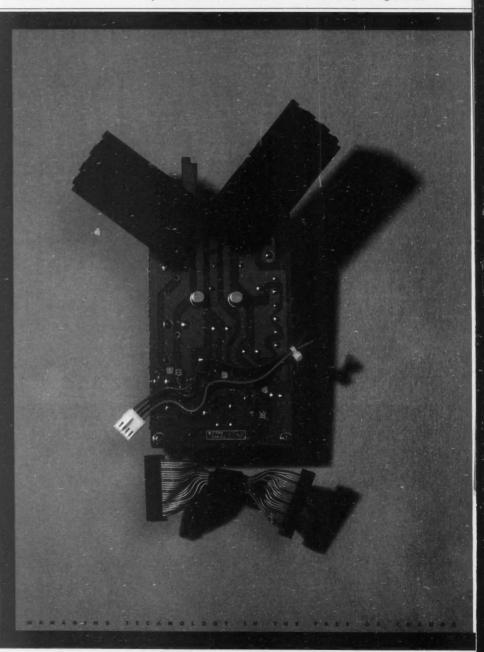
here's a Full Moon rising over Sun these days.
SunSoft, Inc., the software arm of Sun Microsystems, Inc., is working on a scalable clustering technology code-named Full Moon, which it will integrate with an upcoming version of the Solaris operating system.

Scheduled to be available in the first half of next year, Full Moon is the second major clustering initiative announced by Sun this year. Earlier this month, Sun announced high-availability clustering technology for its Ultra Enterprise family of SPARC servers.

Whereas Sun's current products provide high-availability, failover clustering, Full Moon will also allow performance clustering.

According to a Sun spokesman, Full Moon will give users high scalability and can be implemented on machines that range from small department servers all the way up to large server clusters. The cluster will allow users to scale their systems according to their application needs and will provide continuous, uninterrupted access to applications and services, the spokesman said.

Full Moon further strengthens Sun's sudden — and relatively recent — commitment to clustering technology, analysts said. But the company is still far behind the competition. — Jaikumar Vijayan



Apple going after mobile users

CONTINUED FROM PAGE 41

quest. "If you weren't interested in the Newton before, you're not going to be interested now," Staten said.

Observers also said pricing could be an

issue. The MessagePad 2000 is expected to cost less than \$1,000, but increased competition from PDA newcomers Corel Corp. and Microsoft Corp. could drive rival prices well below the \$1,000 mark.

Chris Cain, a computer systems special-

ist at Carson Group, a financial services company in New York that has outfitted a few workers with Newton MessagePads, said he would like to see the Newton function more like a portable calendar and address book and less like a laptop computer.

"Having things like extra programs and a larger screen is not that big a deal when you're doing addresses, appointments, 'to do' lists and quick notes," Cain said. "And if you want a larger screen size, why not just get a PowerBook?"

But not everyone wants to pay the hefty cost of portables, particularly the costconscious education market. For that market, Apple is readying its EMate 300 portable device, priced at less than \$800.

School buys

According to Fred Anderson, Apple's chieffinancial officer, the company had its highestever sales into the education market in its fiscal fourth quarter, which ended Sept. 27. And sales of PowerBooks accounted for 15% of the 933,000 units Apple sold in the quarter.

The EMate 300 is a 4-pound portable device that sports a stylish and rugged outer casing with a bull-in handle. Based on Version 2.0 of the Newton operating system, EMate 300 includes a Web browser, E-mail program, spreadsheet, word processor, drawing program, graphing calculator, address book, notepad and calendar (see chart, page 41).

The device, which is slated for delivery in the first quarter of next year, also comes bundled with a variety of education-specific software and a modern

Briefs

Octopus protects data

Octopus Technologies, Inc. has introduced WinStation for Windows 95, a software product designed to mirror data and provide fault tolerance in the event of a hardware failure, natural disaster or human interference. Octopus WinStation for Windows 95 costs \$49.

EMC on Fed contract

PRC, Inc., which contracts with the U.S. government to provide computer systems, has agreed to offer EMC Corp.'s Symmetrix 3500 disk storage systems under contract. The indefinite delivery contract makes the 3500 the preferred storage platform to be sold with Hewlett-Packard Co.'s HP 9000 servers.

How do you really feel about technology?

It gives you power, it takes it away. It makes your life easier, it makes your life miserable. Of course you have mixed feelings about technology. You're only human.

But that's okay, because we can help. We can provide you with independent technology services that make sure the systems and networks working for you today don't work against you tomorrow. Centralized or decentralized. Mainframe or PC. All manufacturers.

No inflexible commitments. No power struggles. No dysfunction. No anast.

Just the ongoing feeling that technology is your friend, not your foe.

C@MDISCO'

A TECHNOLOGY SERVICES COMPANY

To learn more, visit www.comdisco.com or call 1-800-272-9792.

COMPUTERWORLD'S
NOVEMBER # EDITION
DEADLINE: OCT 31, 3PM

NORTH/CENTRAL

1-800-343-6474 x8201

Pive been hearing a lot about increasing profits incough better communications.

What's the net net?

LERIOTEUROS TENESTINI/TERINET SOLUTIONS.

Come to a free, half-day briefing and find out how the right solutions can help your company work smarter—and more profitably.

As you know all too well, talk is cheap, but technology isn't. That's why we're cutting through all the chatter to provide you with a strategic overview of new technologies which can help keep information, work and profits all moving together.

You'll get an inside look at Microsoft technologies for today and tomorrow, including highlights of the latest Internet/Intranet developments and how they're incorporated in many of our products. You'll observe the latest Microsoft-based solutions for taking advantage of Internet business opportunities, maximizing the benefit from communication-enabled line-of-business applications, enhancing team collaboration with a company intranet, and more. You'll see first-hand how Microsoft Solution Providers are

uniquely qualified to provide you with solutions at an unprecedented level of functionality. And you'll have a chance to sign up with a Solution Provider to conduct a customized evaluation of Microsoft Internet and Intranet products, the latest version of Microsoft Office, Windows® 95, BackOffice®, and development tools.

If you're a business decision maker or information technology professional in an organization with 100 or more employees, and you need to use technology to accomplish business objectives, this briefing is for you.

Call (800) 836-8282, Dept. A778 today to get information about a briefing near you.

Corporate
Solutions
Errofing

COMPUTERWORLD

Microsoft^{*}

WHERE DO YOU WANT TO GO TODAY?

©1996 Microsoft Corporation. All rights reserved. This document is provided for informational purposes only. MICROSOFT MAKES NO WARRANTIES, EXPRESS CIR MIPLED, IN THIS SUMMARY. Microsoft and Windows are registered trademarks and BackOffice and Where do you want to giu today? une trademarks of Microsoft Corporation

COMPUTERWORLD

Everything you need to know.

Save over 73%

TO SECOND	trade	Ci.			
4	Yes, I want to receive my owr per year - a savings of over 7	copy of COMPUTERWORLD	each week. I acc	ept your offer of \$39.95	5*

First Name	an .	Last Name		
Title	Compa	ny		
Address Address Shown: ☐ Home ☐ Business ☐ New	City T Renew Single copy price: \$3,00/asue	State 2 *U.S. Only, Canada \$95, Maxico, Central/South Ar		all other countries \$2
	Please compl	ete the questions below.		
BUBNIESS/INDUSTRY (Circle one) Mansánduser (other than compuse) Pranchinaranoc/Real Estation Pranchinaranoc/Real Estation Medical/Law/Education Wholess/Real/Track Business Service (except DP) Government - Statiff-Sederal/Local Communication Systems/Public Utilises/Transportation	TITLE/FUNCTION (Circle one) SAMS/DP MANAGEMENT Chief Information Officer/Vice Precident Asst. VP ISAMIS/DP Management Conter Conter Conter Conter Conter Conter Conter Conter Conter	12. Vice President, Aset. VP 13. Transure/Controller, Financial Officer DEPARTMENTAL MANAGEMENT 51. Sales & Mids, Management 70. Medical, Legal, Accounting Mg. OTHER PROPESSIONAL MANAGEMENT Elegantoms, Journalists, Students		ntire organization, nches, divisions
 Mining/Construction/Petroleum/ Refining/Agriculture 	Comm., LAN Mgr. /PC Mgr., Tech Planning, Administrative Services	90. Other Titled Personnel	A. 20,000 + B. 10,000 -19,999	0 0
Minuflacture of Computers, Computer-Rollated Systems or Peripherate Systems integrations, VAPIs, Computer Service Burstein, Software Planning & One Computer Peripheral Dealer/Dist./ Retailer Other Other	Dir./Mgr. Sys. Development, Systems Architecture Trogramming Management, Software Developers English Solentific, PAD, Tech. Management English Solentific, PAD, Tech. Management English Solentific, PAD, CORPORATE MANAGEMENT	(ii) Sicilaris (o) Malc CIS (b) Netwars (f) Windows NT (c) CIS/2 (g) Windows (d) Unix (h) NeXTstep Ago, Development Products: ① Yies ① No	H. 20 – 49 J. 10 – 19 K. 1– 9	
(Please specify)	 President, Owner/Partner, General Mgr 	Networking Products Tyes Tho		RADE D

COMPUTERWORLD Everything you need to know.

Save over 73%

Yes, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of \$39.95* per year - a savings of over 73% off the single copy price.

PITS. PRINTED	MI	Last reams	
Title		Company	
Address Shown: O Home O Susiness O New O Review Single copy prior: \$3,000 comp			Zip America \$150, Europe \$295, all other countries \$29
BUBINESSANDUSTRY (Circle one) Manufacture (other than computer) Financonfusurance/Real Estates MacGoald.nevEducation MacGoald.nevEducation Windoald-Pateol/Trade Business Service (except DP) Government - Statefr-Servat Loss Communications Systems/Public Utilities/Transportation	2. TITLE/FUNCTION (Circle one) ISMMS/DP MANAGEMENT 19. Chief Information Officer/vio-President/ Aux. VP ISAMS/T Management 21. Dr./Mgr. MIS Services, linker Central 22. Dr./Mgr. Network Sys., Data 23. Dr./Mgr. Network Sys., Data	DEPARTMENTAL MANAGEMENT 51. Sales & Miking, Management 70. Medical, Legal, Accounting Mgt. OTHER PROPESSIONAL MANAGEMEN 70als 80. Information Confessi Libraria.	including all of its branches, divisions and subsidiaries? (Select only one per column.)
70. Mining/Construction/Petroleum/ Refining/Agriculture	Comm., LAN Mgr. /PC Mgr., Planning, Administrative Ser	Tech Educators, Journalists, Students	A. 20,000 +
80. Menufacturer of Computers, Computer-Related Systems or Peripherals	 Dir./Mgr. Sys. Development, Systems Architecture Programming Management 	 Do you use, evaluate, specify, recom- ment, purchase: (Circle all that apply) 	B. 10,000 -19,999
 Systems Integrators, VARs, Computer Service Bureaus, Softwere Planning & Consulting Services 	Developers 41. Engineering, Scientific; R&D Tach, Management	(a) Scenis (e) Mac OS	F. 100 1000
90. Computer/Peripheral Dealer/Dist./ Retailer 95. Other	60. Sys. Integrators/VARs/Cone CORPORATE MANAGEMENT 11. President. Owner/Partner.Ge	ulting Mgt. (d) Unix (h) NeXTstep Aco, Development Products: 3 Ves 3	No K. 1-9
(Planes marth)	11. Prisabert, Owner/Parent, Ge	meral Mgr. Networking Products 3 Yes 3	No BAOS O

BUSINESS REPLY MAIL FIRST CLASS MAIL PERMIT NO. 558 MARION, OH 43306 POSTAGE WILL BE PAID BY ADDRESSEE COMPUTERWORLD PO BOX 2044 MARION OHIO 43306-4144

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 55B MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P O BOX 2044 MARION OHIO 43306-4144 NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES



Complex dependencies among applications have high potential for failure. 46

Software

Not a prime-time player

Sun's Java lacks supporting tools, middleware, third-party libraries

applications

By Frank Hayes and Sharon Gaudin

fter nine months of hype, hope and bad coffee puns, Java is still not quite ready for prime time. But that isn't stopping some corporate developers who are using it anyway.

Sun Microsystems, Inc.'s Java is easier to use than lan-

guages such as C++, developers said, and it lets users deploy small pilot projects quickly over the Internet on World Wide Web pages. That can serve as a springboard to larger client/server projects that will

run on corporate intranets.

"We are using Java for some real corporate development big internal applications that are managing important systems for us," said Larry Hagerty, senior systems analyst at GTE Data Services in Tampa, Fla., a subsidiary of GTE Corp.

But not everyone is ready to iump in with both feet.

"We're not currently doing any Java application development," said a systems analyst at a paper manufacturer in Chicago. "I just presented # summary of Java to our development groups recently, and some expressed interest. But I have no idea if they're going to follow through."

On their minds

The question for many corporate developers is whether Java has what it takes for real corporate development — all the supporting tools, middleware and third-party libraries that it takes to build client/server applications.

"No, [Java] is not ready for

corporate development," said Paul Mahowald, vice president of retail systems development at Blockbuster Entertainment Group in Fort Lauderdale, Fla. "It doesn't have the class libraries." It will improve, he said, but for now, "you have to do everything yourself."

And the shortage of thirdparty Java libraries brings some developers face-to-face with bugs in Java's own base libraries. "When we try to cus-

tomize it, every time we do something there's a new surprise," said Nate Zuckerberg, a program manager at the U.S. Postal Service in Washington. Still, the bugs won't prevent the Postal Service from begin

ning field tests on a Java-based electronic form for bulk-mail customers, he said.

Another area of weakness is the lack of graphical Java development tools, according to Larry Podmolik, director of technology at Strategy Technology Resources in Chicago, a consultancy that has worked with printing giant R. R. Donnelley & Sons Publishing Corp. on a

major Java application.
Several vendors, including Microsoft Corp. and Symantec Corp., have retrofitted their C++ development environments to let developers write Java code. But corporate developers don't want reconstituted C++ editors — they want Java visual development environments that work like Microsoft's Visual Basic or Sybase, Inc.'s PowerBuilder.

"If somebody ripped out Visual Basic and stuck Java underneath, it would be perfect," said Steve Yalovitser, a Java consultant at Deductive Corp. in New York who has built Java applications for Chemical Bank



GTE Data Services' Larry Hagerty: T'm more or less staking my reputation on Java being here to stay'

and other corporate clients.

Symantec's Visual Cafe and Rogue Wave Software, Inc.'s JFactory come much closer to that approach, letting developers build Java programs by dragging components into place using a mouse. But other long-expected visual Java tool sets — including Borland International, Inc.'s Latte, which was designed to match the ease of use of Borland's popular Delphi development environment — aren't available yet.

Ironically, Java's most widely publicized shortcomings don't concern developers working on internal Java applications. Security researchers have discovered holes in Java that make it possible for hostile Java applets downloaded across the Internet to wreak minor havoc on users' machines.

Those security problems are less of a concern for internal client/ server developers because they can control what

goes into the software they develop. Java's security features make it less prone to cause problems for internal client/ server applications than most other languages, according to users.

"It's just the maturing of this technology, and it will work it-self out," said Tom Boos, vice president of information technology at the Coris division of R. R. Donnelley. He said Sun's JavaSoft unit has patched the embarrassing problems as quickly as they have appeared.

Connection concerns

However, corporate developers are concerned about how Java will connect to legacy applications and databases. Sun has defined a standard for database access known as Java Database Connection, which IBM, Oracle Corp., Informix Software, Inc., Sybase and other database vendors have agreed to adopt. But just as important is Java's ability to connect to mainframe and minicomputer applications—an area where vendors are just beginning to deliver products.

But ready or not, some corporate developers are staking their projects — and more on Java.

"I'm more or less staking my reputation on Java being here to stay," Hagerty said.

Multiple platforms? Maybe

ava applications are supposed to be platform-independent — and they are, to a point.

But developers are learning that even though Java code may run the same on different computers, distributing and installing that code isn't so simple.

"The installation method [for all soft-ware] is different for a Windows PC than for a Mac or Unix," said Paul Jaquish, president of the government systems division at Enterprise Productivity Systems, Inc. in Napa, Calif. The company helped the Postal Service build a Java-based electronic forms application.

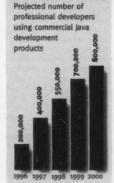
The differences among platforms raised concerns for the Postal Service, which must make sure its customers can download the appropriate Java runtime software for their computers.

"Windows 95 and NT are no problem," said Nate Zuckerberg, a Postal Service program manager, ticking off the popular platforms. "Mac should be OK, and Unix is OK."

The program initially wouldn't run using IBM's beta Windows 3.1 version of Java, "but that got straightened out," Zuckerberg said. "We're just working those problems out as we come to them."

— Frank Hayes and Sharon Gaudin





Source: International Data Corp., Framingham



Points of failure abound in complex app structures

By Sharon Gaudin

Adding client/server applications. Moving applications to the Internet. Buying components. Building an intranet.

Every layer added to a business's application environment increases its complexity and creates more potential points of failure.

"If you step back and look at it, the complexity is mind-boggling," said Larry Hagerty, an information systems manager at GTE Data Services in Tampa, Fla., a subsidiary of GTE Corp. "I would like to say I do plan them out and map the links, but the fact of the matter is, we don't have the detailed documentation that would

give an IS manager a comforted feeling."

"There are so many more details that most people, including me, just aren't used to thinking about. The complexity has increased by a factor of 10," said an IS manager at a major U.S. pharmaceutical company, who asked to remain anonymous. The manager cited factors that add layers of uncertainty, such as users who seek World Wide Web access, Internet and intranet security issues and network configurations.

David Kelly, director of application strategies services at Hurwitz Group, Inc. in Newton, Mass., said that as stresses increase for corporate IS managers, How to avoid an application meltdown

Learn systems and their quirks

Build diagrams of application interdependencies

Consider event management software to detect and prevent errors

Find out how components are structured and what software they depend on the structured are structured and what software they depend on the structured are structured as a structured are structured as structured are structured as s

the chances increase of making a mistake or overlooking a critical link that could shut down a business's entire operation.

Adifferentview

This sense of risk "has exploded the traditional view of the application life cycle," Kelly said at a one-day Hurwitz conference in Chicago this month on preventing application meltdown. "It's a much messier picture. You can't change this increase in complexity. You can only manage it."

Because of the increasing complexity, many IS managers must do a better job of planning their software development process so they can also keep their applications up and running, he said.

Judith Hurwitz, president of

Hurwitz Group and keynote speaker at the conference, said the key to riding herd over a wide array of powerful applications is to plan ahead.

"Before you write a line of code, plan instrumentation. Look at how you'll collect data about problems. Look at code management and integration management," Hurwitz said

Hurwitz and Kelly said IS managers should be aware of what is coming down the road. That insight comes via application development teams made up of developers and operations managers.

"You can build a great application, but it's useless if you can't manage it," Kelly said.

A first-rate report writer

By Howard Millman

Contrary to scientific theory, the most elusive piece of matter in the universe isn't a quark. It's the last bit of information you need to complete a task.

One time-tested method of retrieving essential data is a report writer, and Seagate Software, Inc.'s recently released Crystal Reports 5.0 ranks among the best in its field.

Seagate has added relatively few features to the newest release of Crystal Reports, but

they are important: a more intuitive interface, subreports that summarize the full report, a freeform Report De-

signer, templates and wizards. Crystal Reports 5.0's wiz

Crystal Reports 5.0's wizards, which are intelligent macros, gave me welcome assistance in creating a wide variety of report types. Its new tabbed dialog boxes made most decisions a matter of "click to pick" as I identified my data sources, tables and output options.

I tested the \$395 professional version, meant for information systems staffers, and found that it helps create easy-to-read, professional-looking report templates.

I began by modifying Crystal

Reports' sample files, changing selected text and layout items until I had a document that reported sales by territory and product type and sorted by dollar amount and sales volume.

Although I went on to create reports by using templates and wizards, I preferred to modify the samples by using Crystal Reports' convenient drag-anddrop design features. The package offers more than 100 predesigned reports.

The interface improvements will enable in-house developers

who work with existing data sources to prepare a report with a point and a click. For more advanced projects, program-

mers familiar with Microsoft Corp.'s Visual Basic controls or Foundation Class Library or Borland International, Inc.'s Delphi VCL can embed Crystal Reports' report engine in their custom anplications.

The professional version's license agreement sanctions royalty-free distribution. One of those distribution methods outputs reports in Hypertext Markup Language (HTML) for direct posting on an intranet.

Enhancements to report appearance include multiple formats in one report and the ability to embed subreports in a primary report. Subreports can share a common data source or use multiple and separate data sources, thereby allowing for multiple views of the same data.

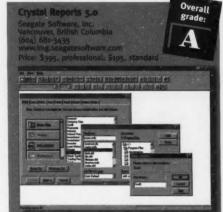
Go professional

The two versions of Crystal Reports — professional and standard — target very different markets.

The standard version, which lacks server access, is limited to accessing data stored in a non-SQL database that resides on the same machine as the application. The professional version gives developers access to remote client/server databases, libraries and links to all popular databases. That versatility makes the professional version worth the extra money.

In earlier versions, a designer's control over the report's final appearance was limited to placing objects in matrix cells. The current version's Report Designer lets you place text, data fields and graphics objects anywhere on a page. New ActiveX support and parameter fields give developers wide latitude in accommodating user input at runtime.

Overall, the effect of the enhancements is to give developers infinite control over the



final appearance of a report.

To its credit, Seagate also corrected some annoying insufficiencies. For example, it has simplified the process of modifying a report. Previously, the Report Expert locked in the design, making it difficult to edit the report.

Adding to its comprehensive list of supported databases, Crystal Reports 5.0 adds support for Microsoft Exchange and databases from Informix Software, Inc. and Arbor Software Corp. It also adds native drivers for Oracle Corp. and Sybase, Inc. SQL Server, bringing its total to more than 25 PC and SQL data sources.

It exports reports in Micro-

soft Excel, Access and Word; Lotus Development Corp. 1:-23 and Notes; Corel Corp. Word-Perfect; and HTML and text formats. It also exports reports as data sets for Open Database Connectivity access.

Overall, Crystal Reports 5.0 deserves high marks for time and effort savings. Accept its moderate learning time, and you will be rewarded with eyecatching, informative reports.

Millman operates the consultancy Data System Services Group and is the co-author of the forthcoming Netscape Server Bible from IDG Books Worldwide. He can be reached at hmillman@mcimail. com.

BUILDERS

"WHEN IT WAS TIME TO INTEGRATE
43 DATABASES INTO A WAREHOUSE...
IT WAS TIME TO CALL THE BUILDERS."

P.J. Matarese, Senior Analyst, Philips Semiconductors



When the competition heats up in the semiconductor business, you accurately match your manufacturing mix, customer demand and profitability or it's time to "cash in the chips." That's why Philips Semiconductors, one of the nation's largest silicon chip manufacturers, decided it needed a faster, more efficient system for key managers to analyze the information stored in the corporation's 40 operational databases. What was the solution? A Data Warehouse built with the help of EDA middleware, FOCUS Six reporting and analysis tools, and an experienced team of application experts...all from Information Builders.

Today, worldwide sales data from three continents is transmitted via TCP/IP network to Philips' data center in Sunnyvale, California. It's then loaded to a mainframe Data Warehouse using EDA middleware technology for data access

and migration. Managers and business analysts in Marketing, Sales and Finance access and analyze the warehouse data with FOCUS Six for Windows EIS Edition, and use FOCUS Six Reporter to create ad hoc reports. The result... business managers keep manufacturing in sync with market demand through better forecasting; while IS managers spend their time developing other strategic systems instead of generating 300 pounds of custom reports each month.

Philips Semiconductors is just one of thousands of examples of how Information Builders has partnered with the world's leading corporations to build enterprise-level reporting and analysis systems. Find out how Information Builders' technology and services can help your organization. Call us at 800-969-INFO.

http://www.ibi.com

800-969-INFO

In Canada Call 416-364-276

Information Builders

FOCUS and EDA/SQL are trademarks of Information Builders. Inc., NY, NY 212-736-4433 E-mail: info@bibi.com WWWW: http://www.ibi.com

Microsoft licensing policy raises cost concerns

Microsoft Corp. has streamlined its licensing policy, but some users are concerned that fewer options will trigger higher costs.

Under fire from customers and critics about the complexity of its software licenses, Microsoft earlier this month unveiled its Select 4.0 licensing program that attempts to simplify the process.

The program will benefit the vast majority of users, but large customers who have found advantageous solutions to Microsoft's licensing puzzle may end up losing some volume discounts, analysts said.

Simpler licenses

Microsoft's new licensing program

SELECT 4.0

- Targets businesses with 1.000 or more PCs
- · Offers four levels of volume discounts
- · Requires two-year contract
- · Offers discount up front
- · Bases discount on two-year purchase forecast

OPEN LICENSE 4.0

- · Targets businesses with 10 to 1,000 PCs
- · Offers three levels of discounts · Requires two-year commitment
- · Bases discount on a buy-in price that is good for length of

commitment "The bottom line for users who had

learned Microsoft's licensing program and how to take advantage of it lis that thisl does nothing but raise prices for them," said Karl Strovink, an analyst at Gartner Group, Inc. in Stamford, Conn. Some reasons for a possible price in-

crease are the elimination of prorated maintenance fees (users will now pay a flat fee); the elimination of Enterprise licenses. which provided the deepest discounts; and the discontinuation of a program that let users apply the purchase of software under one licensing agreement to another to obtain a "double discount," Strovink said.

Although Microsoft claims 20% of its licensing contracts were Enterprise licensing agreements. Strovink estimates that the number of companies potentially affected by the changes could be much higher.

"I would have a difficult time saying that for every customer prices will not go up," said Troy Oldham, licensing marketing manager at Microsoft's Enterprise Customer Unit.

One way costs might increase is if users want concurrent licensing. Microsoft eliminated concurrent licensing in June 1995, but users who want that option can pay for it under the Upgrade Advantage part of the program, which replaces Maintenance.

Lisa Laing, senior network systems analyst at McGill University in Montreal, said the elimination of concurrent user licensing undermines a years-long effort to implement software that meters concurrent usage. That could mean higher costs for McGill when coupled with the expense of adopting Microsoft's new licensing plan, Laing said. McGill has more than 5,000 networked PCs, 80% of which run Windows.

McGill has a decentralized purchasing system that makes it hard to forecast how many Microsoft products it will buy in the next two years, Laing said. Under Microsoft's plan, forecasting is a way to save on software licenses.

W

THE WORLD'S LEADING CLIENT/SERVER. DATA WAREHOUSING AND INTRANET CONFERENCE + EXPOSITION DECEMBER 2-6. 1996 JAVITS CENTER. NYC



KEYNOTE SPEAKERS COLIN WHITE President, DataBase Associates; DB/EXPO CHARLES B. WANG Chairman & Chief Executive Officer Computer Associates Tuesday, Dec. 3, 9:50 am EDWARD J. ZANDER esident, Sun Micr rporate Executive Offi esday, Dec. 3, 12:45 pm THE GREAT DEBATE Weds, Dec. 4, 12:30 pm PHILIP A. BERNSTEIN, Microsoft Corporati OBERT EPSTEIN, Sybase, Inc.

HERR EDELSTEIN, Chairperson, Two Crows Corp.

MICHAEL STONERRANCE, Informix Software, Inc. 100 Conference Sessions

400 EXHIBITS 7 FOCUSED PAVILIONS

- DATA WAREHOUSING PAVILION
 FINANCIAL SOLUTIONS CENTER
- IBM PARTNER PAVILION IBM'S INTERNET THEATER
- MIDDLEWARE PAVILION
 WEB WAREHOUSING CENTER

RETURN THIS COUPON NOW! 0611 Name	☐ FREE Exhibit Pass For All Three Days! ☐ 36-page Feature-Packed Conference Brochure ☐ Information On Becoming An Exhibitor Title	JOIN OVER 25,000 ATTENDES! Conference — December 2-6, 1996 Exposition — December 3-5, 1996	
Company	inte	EXPO Hours: 10:30 am - 5:00 pm	A.
Street	Mail Stop	LOCATION: Javits Convention Center, NYC CALL Us: 1-800-2DB-EXPO	DD/CVDO OF
City	State Zip	WEB ADDRESS: www.dbexpo.com	DR/EVAN 36
Telephone	Fax	MAIL ADDRESS: Blenheim NDN 1975 W. El Camino Real, Suite 307	1
Check here to recieve exclusive di E-Mail Address	scount information and EXPO passes via e-mail!	Mountain View, CA 94040 BLENHEIM.	

BUILDERS THE

I want to use the Internet to create reports from my corporate data.

- Please send me additional information on WebFOCUS
- Please send me a FREE white paper: "Deploying Enterprise Reporting Systems over the Internet".
- Please have a sales rep call ASAP.
- ☐ I want to attend a FREE Seminar.

NAME			
TITLE/DEPT.			_
COMPANY			_
ADDRESS			
CITY	STATE	ZIP	_
TELEPHONE			_

Information



http://www.ibi.com

					NO POSTAGE NECESSARY IF MAILED
	44.63			u	IN THE NITED STATES
			REPLY MAIL		
			IIT NO. 1305 NEW YORK, N'		
				=	
		ATTN: Product Inform	ation Center	=	
		Information Builders P.O. Box 1461		=	
		New York, NY 10117-14	484		
	1000				
	THE REPORT OF		halllaadhalladh	առևևակոհվուն	
	A Partie			Mary Mary	

BUILDERS

EVERYBODY'S WEB SURFIN' THE WebFOCUS WAY.





Sing to Tune of "Surfin' USA"

If everybody had WebFOCUS Then everybody'd do reporting The WebFOCUS WAY

They could access any data Styled reports on their browsers In the Enterprise Before their very eyes

Don't have to know FOCUS Or even S-Q-L Transforms your answers To H-T-M-L

Aggregation on server Thin clients here to stay Better order WebFOCUS Call THE BUILDERS Today

http://www.ibi.com

800-969-INFO

In Canada Call 416-364-2760

Information

The revolutionary thing about our Web-deployable applications is that Mac and PC users can share them.



(Now let's all hold hands and sing Kumbaya.)

With the arrival of the

Management System, peace settles over the

cross-functional teams. And the IS department heaves a great

access the same information, breaking down functional barriers and smoothing the

a wide-area network. Our world-class financials, human resources, procurement and supply chain

and our open licensing policy ensure that no matter what technological challenge the future brings, software up

Visit us at www.lawson.com/insight or call 1-800-477-1357.





D 1996 Lawson Software.

LAWSON INSIGHT™ Business

land. Mac and PC users shake hands and form

sigh of relief. Suddenly every workstation with a Web browser can

way for Activity-Based Management. And it's far less expensive than maintaining

process suites support virtually any client/server platform. What's more, their unique architecture

grades and hardware migrations are quick and financially painless. LAWSON INSIGHT. Because the future can't wait.

You have to migrate your company's entire system to 32-bit. All within a ridiculous timeframe.

Maintaining application compatibility.

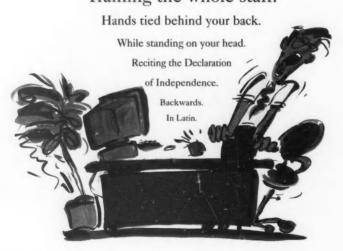
Keeping within allocated budget.

And with minimal downtime.

Including new software.

Maybe some hardware.

Training the whole staff.



Sure, migration can seem like your worst nightmare. But if you choose Stream as your migration partner, we guarantee you'll sleep easier in the months to come. Our confidence comes from being a Microsoft Solution Provider and partner for more than ten years.

This intimate knowledge of Windows 95, NT 4.0™ and Office for Windows 95 allows

us to help you choose the system that's right for you. And, as we do with other Fortune 1000 clients, we'll plan for, configure and install new operating systems and applications. We'll train and support your staff – getting you up and running quickly and seamlessly. So, if you want

your dreams of a successful migration to become a reality, trust us. Microsoft does.

800-507-0363 Call for a FREE Windows 95/NT White Paper.



Faster modems may displace ISDN as the link of choice among users, \$5

The Enterprise Network

LAN/WAN mergers irk users

By Bob Wallace

Users said they see little, if any, benefit to the trend of LAN switching vendors diversifying by acquiring wide-area network equipment vendors.

In fact, users said those vendors should stick to their knitting instead of rushing into the lucrative WAN market.

"The recent acquisitions show that LAN vendors don't want to be left out of the WAN market," said Earl Perkins, a manager of network projects at Entergy Services, Inc., a utility in Gretna, La. "But by doing this, they could be making the mistake of letting their core markets erode."

The recent flurry of WAN vendor acquisitions includes Cabletron Systems, Inc., which announced plans to buy NetLink, Inc., a maker of equipment that lets LANs connect to wide-area frame-relay lines.

Also, 3Com Corp. detailed plans to buy Onstream Networks, Inc., which makes widearea Asynchronous Transfer Mode line access gear. Earlier this year, Cisco Systems, Inc. merged with WAN switch vendor StrataCom, Inc., and IBM allied with StrataCom rival Cascade Communications Corp.

Many users agreed with Perkins. They said LAN switching vendors should focus on completing product lines and improving switching products. Some said the constant blur of mergers and acquisitions by LAN switching vendors has yet to provide substantial user benefits.

"I'm sick and tired of all these acquisitions," said Bill Horst,

chief at the General Services Administration's communications branch in Philadelphia. "I don't believe most of them have advanced LAN switching that much. Many vendors are trying to keep up with Cisco." Cisco recently announced its 14th acquisition in roughly three years, but Horst said it hasn't fully integrated its new properties with its product line.

"Some of the LAN [switching] vendors don't have enough experience in what they're doing now, let alone pursuing the WAN equipment market," said Steve Lopez, network manager at the National Board of Medical Examiners in Philadelphia.

Many switches still need addons and enhancements such as high-speed uplinks for data center switches. "I'd like to see those areas addressed first," Lopez said.

But he said there will eventually be at least one benefit from the WAN vendor acquisitions. "I like to see these moves in the spirit of eventual competition," Lopez said.

Another user said one-stop shopping, a benefit trumpeted by vendors after they make acquisitions, may be overblown.

"One vendor can't always meet all of our criteria," said Richard Jackson, a systems engineer at travel services giant WorldSpan in Atlanta.

Jury still out on NT 4.0 trials

By Laura DiDio

ix weeks after its release, Microsoft Corp.'s Windows NT 4.0 is getting some mixed reviews from early adopters. A dozen network administra-

tors, expert users and systems integrators interviewed by Computerworld said they are generally pleased with the latest release of the operating sys-



But users offered definite caveats about the lack of documentation for some features and

the incompatible hardware drivers that can result in system crashes.

Merrick Printing's

Matthew Merrick: Win-

dows NT 4.0 heta has

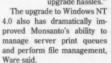
offered a smooth ride

In general, large organizations such as Monsanto Co. and Electronic Data Systems Corp. that have been using Windows NT 4.0 for several months said they are especially pleased with what they consider a "significant performance boost" over Version 3.51. And they were equally enthused about the Windows 95 graphical user interface.

Al Ware, Windows NT 4.0 team leader at Monsanto in St. Louis, installed the upgraded

Microsoft network operating system on 60 servers and 4,000 clients in August, just before the general release.

"In backups alone, we're seeing a 30% performance increase. That saves us five hours of management daily," Ware said. "We've also seen little to no upgrade hassles."



Matthew Merrick, vice president of information systems at Windows NT 4.0, page 55



LAN vendors are buying WAN companies, but users aren't sure what, if any, benefits they'll receive

VENDOR MENEFIT	USERS' COMMENTS
Diversification	Vendor should focus on core products/technologies
Can provide one-stop shopping	 One-stop shopping isn't a key issue
Growth through acquisitions	Prefer greater competition
Can apply skills to new	Vendors are already

Free Web tool manages network

IntraSpection lets users track SNMP devices

By Patrick Dryden

Administrators soon will be able to download free software that lets them check the status of any SNMPenabled device from their favorite browser.

LAN hardware vendor Asante Technologies, Inc. this week will introduce such a tool for free distribution Nov. 15 on the World Wide Web.

IntraSpection gathers information available via the Simple Network Management Protocol (SNMP) and delivers it to operators anywhere via Java applets. That means administrators can sample Web-based management without an investment, without being limited to one vendor's product and without having to wait for vendors to adapt their tools to include browsers as consoles.

Music to their ears

Broad coverage by a free tool "almost sounds too good to be true," said Steve Tindall, an infrastructure project manager at Baxter Healthcare Corp. in Deerfield, Ill.

Sue Darte, connectivity specialist at Pennzoil Co. in Houston, said such a tool would give the operations group valuable remote access to devices.
"And I like servers like this that run
on Windows NT instead of Unix,"
Darte said

IntraSpection lets operators watch internetworking gear, servers, stations and anything else equipped with an SNMP agent and manage them from a simple cross-platform interface at home or out among users.

Optional Personality Modules, which cost 899 each, add proprietary information about devices from Asante and other vendors. Then operators can track custom parameters or watch status lights on an exact representation of that device.

IntraSpection, page 58



IntraSpection will be available to download for free Nov. 15 at www.asante.com



Will The Year 2000 Have Any Impact On Your Environment?

Choose the wrong vendor and it could sink your entire enterprise.

At Computer Associates, we've leveraged over two decades of experience in building tools for application development, maintenance and migra-

CA 2000

tion to create a solution for your Year 2000 problems. CA Discovery 2000 provides the only end-to-end solution for all aspects of your compliance

effort, including analysis, conversion, testing and life-cycle management. And, because our impact assessment tool runs under MVS, VSE and Windows and can access all of the most-popular source library formats, you can start your Year 2000 initiative today.

Behind our CA Discovery 2000 solution stands a Professional Services

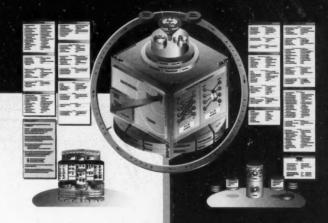
team that is experienced in all aspects of Year 2000 compliance. After all, as the world's leading independent software company, we have more experience reengineering legacy apps than anybody. And with a 20-year track record of success and nearly \$4 billion in revenue, our clients know we'll be around long after the Year 2000.

Preparing your applications for the next century may be the most important job you've ever faced. Start now and turn the biggest challenge of your career into a triumph.

Call us today toll-free at 1-888-4-2000yr. Or visit us at www.cal.com



Client/Server "Aboveware" "Road Map White Paper



presented by:

COMPUTERWORLD

The Newsweekly for IT Leaders





sponsored by:

* INTERSOLV

"Aboveware" builds the software that runs on top of "middleware"

Middleware — Interally the slash (/) in the term client/server — runs withor on top of an organization's internal computing infrastructure, or on top of an Internet/Intranet networking environment.

Compared to solving your client/server application problems, the puzzles you'll find throughout this white paper should be simple.

Of course, even the smartest of us can use a little assistance. If you're looking for help, you'll find your solution from the industry leader at www.intersolv.com

And if you're looking for a better, faster, smarter way to build client/server applications, check out INTERSOLV Allegris, or visit our Web site for the location of an Allegris Seminar near you.

INTERSOLV

Aboveware™

So many software tools... So much confusion...

This special White Paper was written independently of Computerworld by Jeff Tash, president of Database Decisions, a division of Hewitt Associates, LLC.

Aboveware is responsible for creating the valueadded that resides on top of an organization's clients/server infrastructure. Aboveware represents the multitude of application development tools used to build clients/server systems. Before choosing any aboveware application development tool, it is imperative to understand that:

- 1. Tools shape the solution.
- 2. Problems get defined in terms of available solutions.

There is no single universal software development tool because there is no single universal type of software application. Rather, think in terms of three fundamentally different classes of computer applications:

- OLTP (On-Line Transaction Processing)
- OLCP (On-Line Complex Processing)
- OLAP (On-Line Analytical Processing)

Each class requires different underlying information models and application development approaches.



There are a multitude of application development tools currently on the market. The problem is trying to determine which products to use for various applications and tasks. That's where the Client/Server "Aboveware" Road Map can help. Included as a supplement to the August 1996 Computerworld Client/Server Journal, the Client/Server "Aboveware" Road Map serves as a progressive extension to the Client/Server Infrastructure Road Map, which appeared in Computerworld Client/Server Journal in both 1994 and 1995.

The Client/Server Road Map series is a collection of infographic wall posters that visually explain and help simplify the overwhelming complexity associated with client/server computing. The Road Maps provide a framework for describing the many different categories of client/server software products. These maps help prevent application developers from making erroneous product comparisons between "apples" and "oranges."

The Aboveware Road Map focuses on application development tools. The Infrastructure Road Map describes middleware products. A forthcoming Client/Server "Webware" Road Map will address the products associated with the development and deployment of Intermet/Intranet applications.

OLTP vs. OLCP vs. OLAP

The Aboveware Road Map distinguishes three distinct classes of applications software. The first and most common is on-line transaction processing (OLTP), which includes the vast majority of existing, host-based, legacy applications. OLTP systems are characterized by transactions that are simple (a few lines of code) and short (a few seconds to a couple of minutes). Almost always, the data processed by an OLTP **Different life** application is simple, consisting cycle tools are mainly of numbers, character required at different strings and dates. Traditionally, OLTP applications automate operstages of the ational systems. The target audidevelopment ence for most OLTP applications is process clerical workers (e.g., bank tellers, airline reservation clerks, order-entry personnel). The typical OLTP system involves simple updates posted against production databases by multiple concurrent users who are frequently geographically dispersed. Some OLTP applications involve large numbers of users, post high transaction volumes or access very large databases. Almost always, OLTP transactions are homogeneous and uniform (i.e., many people running the same applications simultaneously).

On-line complex processing (OLCP) contrasts with OLTP in that OLCP transactions involve complex data. OLCP must be able to handle text, graphics and image, as well as audio and video multimedia data types. OLCP must also be able to manage the requirements associated with application-specific complex data types, such as geographic maps, engineering drawings or seismic recordings. OLCP applications can also be fundamentally different than OLTP in other ways. For instance, OLCP transactions are frequently complex (many lines of code) and long-running (a few minutes up to sometimes several hours) and involve few concurrent users. Typically, the users of OLCP applications are a widely diverse and heterogeneous group of knowledge workers (e.g., engineers, stock brokers or customer service representatives). Object technology serves as the key enabler underlying OLCP, especially when coupled with workflow technology. The advent of objects, components and applets (e.g., OLE, Common Object Request Broker Architecture, ActiveX, OpenDoc and Java) is contributing to an explosive growth in the development of OLCP systems.

The third and last class of Aboveware deals with online analytical processing (OLAP). The popularity of OLAP has erupted along with the rapid emergence of data warehouses and data marts. In comparison with OLTP and OLCP, OLAP deals exclusively with read-only data. OLAP is driven by the business need to transform data into information. To accomplish this, knowl-

into information. To accomplish this, knowledge workers must be able to perform ad hoc, exploratory analysis, accessing potentially

very large amounts of data. OLAP applications are regularly designed to deal with multidimensional and aggregated data. This includes support for drilldown reporting, roll-up consolidations and slicing and dicing.

Regardless of whether you're building an OLTP, OLCP or OLAP application, all software development projects require life cycle tools. The traditional CASE "waterfall" methodologies that

were used to build host-based applications are no longer popular. In their place, a new, more flexible rapid application development (RAD) approach has arisen. As illustrated in figure 1, this new style of development resembles a "spiral" of multiple, iterative passes through successive stages.

3-Tier and Transaction Management

The first generation of client/server applications was built and deployed using a "fat" client approach. With fat clients, all executable code resides on the desktop PC with the only exception being the database management

system. As illustrated in figure 2, fat client applications issue SQL requests



over the network to back-end relational database engines such as Oracle, Informix, Sybase, DB2 or SQL Server, which then send data back and forth.

A major problem that software developers have experienced with the fat client approach involves version control and configuration management. In the fat client model, every software change necessitates that new code be reinstalled to perhaps hundreds or even thousands of desktop systems. This has rapidly grown into a management nightmare as more and more client/server applications have moved into production.

It's extremely costly and logistically difficult to constantly push modified software modules out onto client desktop machines. Moreover, it's impossible to install new updated versions of software modules on a PC that either isn't turned on or isn't connected to the network. This lack of control greatly complicates the management task of continuously monitoring and tracking the various versions of software modules installed on all the different platforms connected to an organization's computing network.

One way to simplify the task of version control and configuration management begins by identifying where in an application changes take place most frequently. It turns out that the vast majority of requested changes to an application rarely involve modifications to the visual objects comprising the graphical user interface. Similarly, updates to an application's underlying DBMS data model are very infrequent. Rather, it's the business rules and/or business processes that repeatedly change.

This revelation has led to a new, second generation of client/server systems that are built based on a 3-tier model. With the 3-tier model, as shown in figure 3, an application is divided into three components:

- 1) a presentation layer
- 2) an application layer
- 3) a data layer

Essentially, 3-tier takes the fat client's commingled graphical user interface (GUI) and business logic and separates them into distinct modules. The primary advantage of introducing an application layer as a bridge between the client GUI and the server database engine is to minimize the cost and complexity of software maintenance. In the 3-tier model, volatile business logic is maintained separately on its own secure application servers. This makes it dramatically easier to modify application software code without updating a large number of individual desktop platforms.

A second major problem exhibited by fat client applications has been very poor scalability: Performance degrades rapidly as the number of users and the volume of transaction traffic increases. There are a couple of reasons why this happens.

First of all, fur clients require that numerous small messages be communicated between the desktop GUI and the back-end DBMS. Look, for example, at a simple debit/credit transaction. Using the fat client model, a PC must begin by sending a message to the server issuing a request for the debit record. The server must then send back a message after retrieving the debit data. Next, the client must request the credit record. Again, the server must return a message containing

the credit data. The PC must then transmit two subsequent messages to the server to update the debit record and the credit record. Finally, the PC client must send a message instructing the server to commit the transaction. The server responds with an acknowledgment.

This simple example of a debit/credit transaction requires the transmission of multiple distinct messages between the client and the server. So what's the problem? Most LANs are based on either Ethernet or Token Ring technology. Both depend on a contention-based access method for sharing bandwidth. As the number of users connected to the network increases, and the volume of messages that need to be transmitted over the network increases, the amount of time an application must sit in a queue and simply wait for access to the network also increases. This occurs each time the application needs to transmit a message. So what's the solution? Decrease the number of messages that need to be transmitted. That's precisely what the 3-tier model of application partitioning provides.

With 3-tier, the application developer issues a single request from the GUI client to a back-end debit/credit application server. Because the database server is usually executing on the same machine as the application server, the only additional message that must be transmitted back across the network is the final acknowledgment that the transaction has been completed.

A second aspect of the client/server scalability problem is visually portrayed in the top portion of figure 3. It deals with the problem of managing connections between clients and servers. As the number of clients and the number of servers grow, the number of connections between them grows. The left-hand side of the diagram in figure 3 depicts a 2-tier approach. Notice how the number of connections between clients and servers grows exponentially. If you have N clients and M servers, you'll need to manage N x M connections. Contrast this scenario with the 3-tier model presented on the righthand side of the diagram in figure 3. In this case, the middle tier represents a distributed transaction processing (DTP) monitor, such as Encina, CICS or Tuxedo. Essentially, the DTP monitor acts as a transaction router. By providing a transaction routing service, the DTP monitor significantly decreases the number of connections required between clients and servers. Network expansion follows an arithmetic growth curve

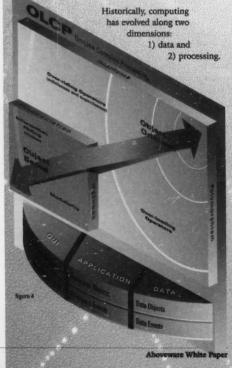
instead of a geometric explosion. Because of transaction routing, if you have N clients and M servers, you'll need to manage only N + M connections.

The advantage of 3-tier over 2-tier is compelling in a large-scale enterprise client/server environment. Furthermore, a secondary benefit of the 3-tier model is its ability to increase availability, reliability and manageability. With DTP monitors, application servers can be replicated to increase availability and performance, including automatic load balancing and restart of failed application servers.

Object-Based and Object-Oriented

As computing leaped from the data center to the desktop, the very essence of applications changed dramatically. Instead of simply automating existing operational business processes, new applications, such as desktop publishing, have enabled knowledge workers to do more with less – and do it more effectively. This new wave of applications technology was designed to handle signifi-

cantly more complex types of data than simply numbers, character strings and dates.



Ever since von Neuman in the 1940s, computer hardware has been designed with a main storage memory that holds both data and process (i.e., program). Software designers – the folks responsible for creating the programs that execute on top of the hardware – have continuously striven to increase the levels of abstraction in which developers deal with both the data and the processing dimensions.

By the 1980s, the abstraction for the data dimension had matured to the level of entities and relationships (also known as the ER model). Advances in the level of abstraction along the process dimension had led to the development of structured programming concepts. During the past decade, we have continued to witness ever higher levels of abstraction along both the data and the processing dimensions, resulting in a new paradigm referred to as object computing.

In the top portion of figure 4, the data dimension corresponds to the vertical axis and the process dimension corresponds to the horizontal axis. Let's explore how object technology has raised the level of abstraction along both of these dimensions.

Objects represent one of the most significant break-throughs in our understanding of how to model complex systems. Prior to objects, we had a data model based on entities and relationships and a process model representing a top-down functional decomposition of an automated system. A data model is a computerized representation of real world entities. Examples include employees, departments, customers, parts, suppliers, policies, claims, etc. A major advantage of modeling entities is their lack of volatility (i.e., they rarely change), especially by comparison with process model procedures that constantly change (e.g., every time a company undergoes a business reorganization).

In a conventional system, entities are passive data stores manipulated by active independent procedures. In an object system, entities communicate explicitly.

An object combines an entity's properties (e.g., an employee's name, social security number, date of birth, etc.) with its operations (e.g., hiring an employee, firing an employee, giving an employee a raise, etc.). Encapsulation refers to the hiding of an object's properties within the object itself.

Objects, Components and Applets

OLCP computing can be thought of in terms of black boxes and white boxes (sometimes referred to as breadboarding).

Black boxes are components or applets that correspond to objects with well-defined inputs and well-defined outputs. The simplest are GUI controls, such as text boxes, radio buttons or list boxes, that respond to simple events such as clicking or double-clicking a mouse button. Numerous new and much more sophisticated components and applets are currently being developed based on ActiveX and Java.

Black box objects are essentially canned solutions. Individual components and applets are stored inside class libraries. But finding the right black box object can be immensely difficult. The dilemma is that when developers search the class library, they don't have a solution in hand – they have a problem. How do you search a solution space when you're coming from a problem space? There's a lack of impedance. That's where white boxes play an important role.

White boxes are basically workflow scripts that are triggered by business events. The individual steps comprising the workflows manipulate the black box components and applets. They provide a frame of reference that localizes the portions of class libraries that need to be searched.

Because of encapsulation, the only way one object can interact with another is via its operations. How? By one object sending a message to another object. Associated with each message is a method that defines the step-by-step instructions for carrying out each procedural operation.

the credit data. The PC must then transmit two subsequent messages to the server to update the debit record and the credit record. Finally, the PC client must send a message instructing the server to commit the transaction. The server responds with an acknowledgment.

This simple example of a debit/credit transaction requires the transmission of multiple distinct messages between the client and the server. So what's the problem? Most LANs are based on either Ethernet or Token Ring technology. Both depend on a contention-based access method for sharing bandwidth. As the number of users connected to the network increases, and the volume of messages that need to be transmitted over the network increases, the amount of time an application must sit in a queue and simply wait for access to the network also increases. This occurs each time the application needs to transmit a message. So what's the solution? Decrease the number of messages that need to be transmitted. That's precisely what the 3-tier model of application partitioning provides.

With 3-tier, the application developer issues a single request from the GUI client to a back-end debit/credit application server. Because the database server is usually executing on the same machine as the application server, the only additional message that must be transmitted back across the network is the final acknowledgment that the transaction has been completed.

A second aspect of the client/server scalability problem is visually portrayed in the top portion of figure 3. It deals with the problem of managing connections between clients and servers. As the number of clients and the number of servers grow, the number of connections between them grows. The left-hand side of the diagram in figure 3 depicts a 2-tier approach. Notice how the number of connections between clients and servers grows exponentially. If you have N clients and M servers, you'll need to manage N x M connections. Contrast this scenario with the 3-tier model presented on the righthand side of the diagram in figure 3. In this case, the middle tier represents a distributed transaction processing (DTP) monitor, such as Encina, CICS or Tuxedo. Essentially, the DTP monitor acts as a transaction router. By providing a transaction routing service, the DTP monitor significantly decreases the number of connections required between clients and servers. Network expansion follows an arithmetic growth curve

instead of a geometric explosion. Because of transaction routing, if you have N clients and M servers, you'll need to manage only N + M connections.

The advantage of 3-tier over 2-tier is compelling in a large-scale enterprise client/server environment. Furthermore, a secondary benefit of the 3-tier model is its ability to increase availability, reliability and manageability. With DTP monitors, application servers can be replicated to increase availability and performance, including automatic load balancing and restart of failed application servers.

Object-Based and Object-Oriented

As computing leaped from the data center to the desktop, the very essence of applications changed dramatically. Instead of simply automating existing operational business processes, new applications, such as desktop publishing, have enabled knowledge workers to do more with less – and do it more effectively. This new wave of applications technology was designed to handle signifi-

cantly more complex types of data than simply numbers, character strings and dates.



Ever since von Neuman in the 1940s, computer hardware has been designed with a main storage memory that holds both data and process (i.e., program). Software designers - the folks responsible for creating the programs that execute on top of the hardware - have continuously striven to increase the levels of abstraction in which developers deal with both the data and the processing dimensions.

By the 1980s, the abstraction for the data dimension had matured to the level of entities and relationships (also known as the ER model). Advances in the level of abstraction along the process dimension had led to the development of structured programming concepts. During the past decade, we have continued to witness ever higher levels of abstraction along both the data and the processing dimensions, resulting in a new paradigm referred to as object computing.

In the top portion of figure 4, the data dimension corresponds to the vertical axis and the process dimension corresponds to the horizontal axis. Let's explore how object technology has raised the level of abstraction along both of these dimensions.

Objects represent one of the most significant breakthroughs in our understanding of how to model complex systems. Prior to objects, we had a data model based on entities and relationships and a process model representing a top-down functional decomposition of an automated system. A data model is a computerized representation of real world entities. Examples include employees, departments, customers, parts, suppliers, policies, claims, etc. A major advantage of modeling entities is their lack of volatility (i.e., they rarely change), especially by comparison with process model procedures that constantly change (e.g., every time a company undergoes a business reorganization).

In a conventional system, entities are passive data stores manipulated by active independent procedures. In an object system, entities communicate explicitly.

An object combines an entity's properties (e.g., an employee's name, social security number, date of birth, etc.) with its operations (e.g., hiring an employee, firing an employee, giving an employee a raise, etc.). Encapsulation refers to the hiding of an object's properties within the object itself.

OLCP computing can be thought of in terms of black boxes and white boxes (sometimes referred to as breadboarding).

Black boxes are components or applets that correspond to objects with well-defined inputs and well-defined outputs. The simplest are GUI controls, such as text boxes, radio buttons or list boxes, that respond to simple events such as clicking or double-clicking a mouse button. Numerous new and much more sophisticated components and applets are currently being developed based on ActiveX and Java.

Black box objects are essentially canned solutions. Individual components and applets are stored inside class libraries. But finding the right black box object can be immensely difficult. The dilemma is that when developers search the class library, they don't have a solution in hand - they have a problem. How do you search a solution space when you're coming from a problem space? There's a lack of impedance. That's where white boxes play an important role.

White boxes are basically workflow scripts that are triggered by business events. The individual steps comprising the workflows manipulate the black box components and applets. They provide a frame of reference that localizes the portions of class libraries that need to be

Because of encapsulation, the only way one object can interact with another is via its operations. How? By one object sending a message to another object. Associated with each message is a method that defines the step-by-step instructions for carrying out each procedural operation.

000

In the basement there are 3 light switches in the "off position."

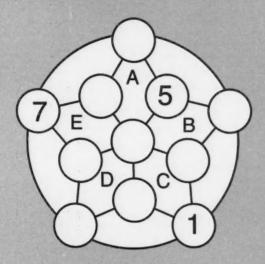
Each switch controls 1 of 3 light bulbs on the floor above. You may move any of the switches, but you may only go upstairs one time.

How can you determine which switch controls each light bulb?

INTERSOLV www.intersolv.com

1-888-625-3286

Place the numbers 1 through 11 in the grid so that the total of the numbers in each diamond (A-E), as well as the outer circle, is 25. Three numbers have been placed to start you off.



INTERSOLV

www.intersolv.com 1-888-625-3286 Any software development environment that supports encapsulation and methods is referred to as object-based. In an object-based computing environment, the only objects that are available to the application developer are those provided by the software tool vendor or third-party, after-market suppliers. Application developers cannot create their own new classes of objects. Microsoft Corp.'s Visual Basic is a classic example of an object-based development environment.

As shown in figure 4, object-oriented implies moving to higher levels of abstraction along both the data and the process dimensions. With object-oriented, the objects bundled with the product are referred to as its foundation classes. Developers can create new, user-defined object classes through inheritance. Inheritance uses the concept of subclasses to enable developers to extend generic solutions in order to handle special cases. Specialization is accomplished by allowing new operations to be added or existing operations to be overridden. Inheritance enables developers to build applications according to the way end users express their requirements – by exception.

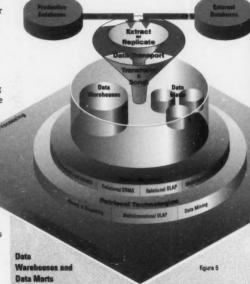
The object-oriented property known as polymorphism supports the overloading of operators. Polymorphism enables objects to act intelligently – to assume responsibility. People use polymorphism all the time in their everyday language. For instance, think about a person's behavior in response to the following polymorphic commands: Answer the phone; answer the door; answer a letter; answer a question. People are smart – they'll choose appropriate behavior based on the type of object being answered. In terms of object technology, polymorphism implies intelligence. The object receiving a message knows how to behave based on the action requested. The sender object (i.e., the requester) doesn't need to worry about which behavior is appropriate. The receiver object (i.e., the server) is responsible.

Smalltalk, C++ and Java are representative of objectoriented development environments.

The bottom portion of figure 4 depicts the object model's approach to 3-tier computing. Applications are comprised of three types of objects:

- 1) visual objects
- 2) business objects
- 3) data objects

Associated with each type of object are events.



The primary goal of OLTP and OLCP is the automation of business processes. The driving force behind OLAP is fundamentally different. OLAP is intended to enable better, more timely and more effective business decision-making.

To help provide end users with easy access to accurate and consistent data, information systems organizations have been building data warehouses and data marts. This approach represents a dual database strategy:

- operational databases for production applications (OLTP and OLCP)
- retrieval-only databases for decision support (OLAP)

The principal reason why a dual database strategy is needed is because there are two distinct measures of time: 1) a point in time, and 2) a time interval.

For OLTP and OLCP, databases define business states. At any specific point in time, the database represents a snapshot record of the business (e.g., a bank account's balance or the number of widgets in an inventory bin). Transactions track the state-to-state transitions caused by business events (e.g., withdrawing money from a bank account or shipping a widget from inventory).

OLAP applications, on the other hand, involve retrieving information. Frequently, these retrievals require examining data across time intervals to be able to identify business trends. For example, how many units of product X were sold in the past month? How do those sales figures compare with last month's? How do they compare with the same month a year ago?

Data warehouses and data marts represent time series of extracts (i.e., snapshots of data built up as time layers) from either production databases or external information sources. The difference between a data warehouse and a data mart is simply one of scope. A data warehouse reflects a top-down enterprise strategy, while a data mart represents a bottom-up approach targeted at the departmental or workgroup level.

The top portion of figure 5 graphically depicts the process of extracting, scrubbing (i.e., cleaning), transforming and transporting data from one or more operational systems or external information sources into data warehouses/data marts. The data itself is subject-oriented, nonvolatile and time-variant. Generally, both detailed and summarized data is maintained.

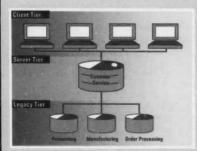
In essence, you should think about data warehouses and data marts as simply the electronic equivalent of all those hard-copy printed reports that for so many years have been spewing forth from line printers and being distributed to end users. Of course, where OLAP really makes a huge difference is with the easy-to-use tools that make it fast and simple for end users to readily access their information.

Integrating Multiple Heterogeneous Sources

One of the major benefits of data warehouses and data marts is their ability to provide access to accurate and consistent data that is integrated from multiple heterogeneous sources. What makes integration difficult is that the same data is often represented differently in different legacy systems. Since the data warehouse is read-only and nonvolatile, the legacy data can be integrated and made consistent during the data extraction, data scrubbing, data transformation and data transport process. But there are other applications, such as customer service, where integration and consistency are needed, but for use with volatile, operational data.

Customer data is generally scattered across numerous legacy applications. For example, customer data might exist in the following systems:

- accounting
- · manufacturing
- order processing



The best technical solution for providing integrated and consistent customer data from all of these operational legacy applications is to create OLCP-like classes of objects that effectively wrap OLTP legacy applications. These wrapped legacy components can then be combined and manipulated in exactly the same way that developers work with other components and applets.

Any software development environment that supports encapsulation and methods is referred to as objectbased. In an object-based computing environment, the only objects that are available to the application developer are those provided by the software tool vendor or thirdparty, after-market suppliers. Application developers cannot create their own new classes of objects. Microsoft Corp.'s Visual Basic is a classic example of an objectbased development environment.

As shown in figure 4, object-oriented implies moving to higher levels of abstraction along both the data and the process dimensions. With object-oriented, the objects bundled with the product are referred to as its foundation classes. Developers can create new, user-defined object classes through inheritance. Inheritance uses the concept of subclasses to enable developers to extend generic solutions in order to handle special cases. Specialization is accomplished by allowing new operations to be added or existing operations to be overridden. Inheritance enables developers to build applications according to the way end users express their requirements – by exception.

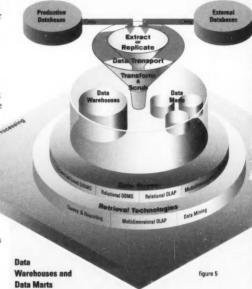
The object-oriented property known as polymorphism supports the overloading of operators. Polymorphism enables objects to act intelligently – to assume responsibility. People use polymorphism all the time in their everyday language. For instance, think about a person's behavior in response to the following polymorphic commands: Answer the phone; answer the door; answer a letter; answer a question. People are smart – they'll choose appropriate behavior based on the type of object being answered. In terms of object technology, polymorphism implies intelligence. The object receiving a message knows how to behave based on the action requested. The sender object (i.e., the requester) doesn't need to worry about which behavior is appropriate. The receiver object (i.e., the server) is responsible.

Smalltalk, C++ and Java are representative of objectoriented development environments.

The bottom portion of figure 4 depicts the object model's approach to 3-tier computing. Applications are comprised of three types of objects:

- 1) visual objects
- 2) business objects
- 3) data objects

Associated with each type of object are events.



The primary goal of OLTP and OLCP is the automation of business processes. The driving force behind OLAP is fundamentally different. OLAP is intended to enable better, more timely and more effective business decision-making.

To help provide end users with easy access to accurate and consistent data, information systems organizations have been building data warehouses and data marts. This approach represents a dual database strategy:

- operational databases for production applications (OLTP and OLCP)
- retrieval-only databases for decision support (OLAP)

The principal reason why a dual database strategy is needed is because there are two distinct measures of time: 1) a point in time, and 2) a time interval.

For OLTP and OLCP, databases define business states. At any specific point in time, the database represents a snapshot record of the business (e.g., a bank account's balance or the number of widgets in an inventory bin). Transactions track the state-to-state transitions caused by business events (e.g., withdrawing money from a bank account or shipping a widget from inventory).

OLAP applications, on the other hand, involve retrieving information. Frequently, these retrievals require examining data across time intervals to be able to identify business trends. For example, how many units of product X were sold in the past month? How do those sales figures compare with last month's? How do they compare with the same month a year ago?

Data warehouses and data marts represent time series of extracts (i.e., snapshots of data built up as time layers) from either production databases or external information sources. The difference between a data warehouse and a data mart is simply one of scope. A data warehouse reflects a top-down enterprise strategy, while a data mart represents a bottom-up approach targeted at the departmental or workgroup level.

The top portion of figure 5 graphically depicts the process of extracting, scrubbing (i.e., cleaning), transforming and transporting data from one or more operational systems or external information sources into data warehouses/data marts. The data itself is subject-oriented, nonvolatile and time-variant. Generally, both detailed and summarized data is maintained.

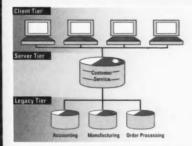
In essence, you should think about data warehouses and data marts as simply the electronic equivalent of all those hard-copy printed reports that for so many years have been spewing forth from line printers and being distributed to end users. Of course, where OLAP really makes a huge difference is with the easy-to-use tools that make it fast and simple for end users to readily access their information.

Integrating Multiple Heterogeneous Sources

One of the major benefits of data warehouses and data marts is their ability to provide access to accurate and consistent data that is integrated from multiple heterogeneous sources. What makes integration difficult is that the same data is often represented differently in different legacv systems. Since the data warehouse is readonly and nonvolatile, the legacy data can be integrated and made consistent during the data extraction, data scrubbing, data transformation and data transport process. But there are other applications, such as customer service, where integration and consistency are needed, but for use with volatile, operational data.

Customer data is generally scattered across numerous legacy applications. For example, customer data might exist in the following systems:

- · accounting
- · manufacturing
- · order processing



The best technical solution for providing integrated and consistent customer data from all of these operational legacy applications is to create OLCP-like classes of objects that effectively wrap OLTP legacy applications. These wrapped legacy components can then be combined and manipulated in exactly the same way that developers work with other components and applets.

OLAP data is physically stored in either a relational DBMS or a multidimensional DBMS. Data warehouses and data marts can frequently grow from a few gigabytes up into the terabyte-size range. End users can also usually access their operational data directly using a variety of middleware products.

As shown at the bottom of figure 5, there are three fundamentally different types of OLAP applications commonly used to access data warehouses and data marts:

- 1) query and reporting
- 2) multidimensional analysis
- 3) data mining

Query and reporting tools allow end users to easily generate their own reports and charts while simultaneously enabling IS to retain control over critical data access activities such as security.

Multidimensional analysis products provide facilities that make it fast and easy for analysts to drill down from summary-level views of data to detailed data or to roll-up from detailed data to consolidated summary views. Multidimensional analysis tools help analysts quickly identify trends by enabling them to easily slice and dice their data to shift perspectives.

For both query and reporting, as well as for multidimensional analysis, the end user drives the process of extracting information from the data warehouse. Sometimes, though, users don't necessarily know what it is they're searching for. What's really needed, instead, is an automated process that can go off and discover underlying patterns hidden within the data. The automatic discovery-driven extraction of previously unknown information is commonly referred to as data mining.

Modeling Abovewere

Our discussion of Aboveware began by observing that:

1) tools shape the solutions; 2) problems get defined in terms of available solutions; and 3) there's no single universal software development tool because there's no single universal type of software application. Equally powerful is the idea that all three types of Aboveware have their own unique modeling requirements. In other words, an OLTP enterprise model will be different than an OLCP enterprise model, which will be different than an OLAP enterprise model, even though all three are modeling the same fundamental set of underlying business entities.

Data models designed for OLTP applications are built based on the rules of data normalization. According to normalization, the overriding objective of database modeling is to minimize data redundancy. The normalization process begins with the first normal form requirement that all repeating groups be eliminated. Second and third normal forms ensure that all many-to-many and one-to-many relationships among different entities are properly accounted for, respectively. The ultimate design goal is to create a data store in which each fact is recorded once and only once. With normalized data models, associated data can be combined at runtime using a database

join operation.
This enables any
one-to-one,
one-to-many
or many-tomany relationships
among various entities
to be easily
accessed
from within

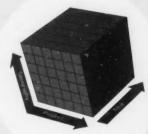


figure 6

Note that normalized databases are highly optimized for

an application.

updates (i.e., adds, deletes and changes). Retrievals, on the other hand, especially those requiring multiple table joins, will frequently perform poorly in a highly normalized database environment. Of course, this isn't a problem for OLTP because most OLTP applications are primarily intended to perform

lots of simple updates. The most important requirement for OLTP is to ensure the highest degree of data integrity possible. The worst thing imaginable for OLTP would be the presence of inconsistent, redundant data.

An OLCP model will obviously resemble its OLTP counterpart. After all, both need to reflect an organization's entities and relationships. But there is a major difference. OLTP applications depend on relational DBMSs for their data store. Relational technology can easily model entities and relationships. However, OLCP applications depend on object technologv. While an object model can accommodate one-to-one, oneto-many and many-to-many associations, it can also represent a different type of relationship called an aggregation. Aggregations describe composite objects: objects made up of other objects. The aggregation relationship ranges from a whole (e.g., a compound document) to a part (e.g., a table of contents, chapters and an index). A bill of materials is a wonderful example of an aggregation relationship. There is no simple way to represent a bill of materials in a relational data model. A programmer must write the navigational logic to perform part implosions and explosions.

Aggregation is an example of what is known as the closure property. Closure is phenomenally powerful. The very first time I can remember learning about closure was way back when I studied integer algebra. I was taught that if you add two integer numbers together, the sum is always another integer. I was also always impressed by the closure property provided by the relational data model. If you take two relational tables and join them together, what do you get as a result? A relational table. The closure property supported by the object model's aggregation relationship enables one object

to be embedded inside another object. Embedding objects inside other objects enables software developers to hide all kinds of implementation complexity.

Because an object model supports aggregation and a relational data model does not, the two models are guaranteed to be different by definition. The ability to handle aggregation relationships is one of the key features provided by object-oriented DBMS products.

Most RDBMS vendors are currently evolving their systems into universal servers in order to be able to handle the requirements

for supporting aggregation (and other object model features).

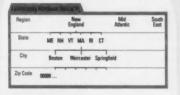
Currently, if an object-oriented OLCP system uses an RDBMS for its data store, then a programmer must write mapping software that can translate between the application's object model and the database's relational model.

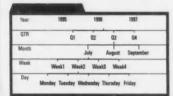
The data model needed for OLAP requires yet another database design. To start with, the primary purpose of OLAP applications is to allow end users to perform their own ad hoc database queries, generate reports and graphically chart data. The third normal form data models developed for OLTP applications deliver appalling performance in this retrieval intensive environment. At a minimum, data must be denormalized to speed up database retrievals. In

essence, query performance is improved by storing redundant data. Since the data is read-only, integrity is not an issue.

One of the key objectives of OLAP is to facilitate business analysis. The key to analysis is to provide support for comparisons. The best way to accomplish comparisons is through a different kind of data model known as multidimensional. A multidimensional data model is a hypercube that contains some numeric

Dimensiona Modelina





data describing a business metric, such as sales. budgets, inventory, market share, etc. Each metric exists within the context of dimensions, such as time, geography or product type (see figure 6). Moreover, the separate dimensions are themselves typically described by hierarchical attributes (see figure 7). End users analyze their data by drilling down and rolling up through these dimensional hierarchies or by slicing and dicing in order to examine subsets of their multidimensional hypercubes. There's a class of multidimensional DBMS products specifically designed to facilitate OLAP data access. Alternatively, there's another set of tools available known as relational OLAP, or ROLAP, that enable end users to drill down, roll up and slice and dice against data stored directly in an

The most important message is to understand there is no single, universal model that can describe an organization's information needs. Multiple models are required. The situation is analogous to a building architect's design blueprints. For example, if an architect were designing a house, there'd be one set of blueprints for the carpenters, another set for the plumbers and yet another set for the electricians. With Aboveware, you'll need one information model for OLTP, another for OLCP and yet another for OLAP. They are all related in that they're all modeling the same enterprise. On the other hand, they are all different because they're attacking different information issues.



 \odot 1996, Jeffrey B. Tash. Aboveware is a registered trademark of Database Decisions and Hewitt Associates, LLC.

The Road Map Series

The Road Map Series was created by Jeff Tash, president of Database Decisions, a division of Hewitt Associates, LLC. **Database Decisions** specializes in an approach to information technology consulting we call gestalt computing. which literally means the whole is greater than the sum of its parts. The



Client/Server Road Maps are just one example of this philosophy. They present very complex technical material in an easy-to-understand manner that puts everyone on the same page.

To order Client/Server Road Maps call: (800) 381-7515

Through consulting and lecturing, Database Decisions helps businesses adapt to new technologies by establishing realistic goals and visions that can be shared by both IS professionals and the end user community.

For additional information on services provided by Database Decisions please contact:

Database Decisions 95 Sawyer Road, Suite 600 Waltham, MA 02154

Phone: (617) 891-3600 Fax: (617) 891-0935 Internet: dbd@tiac.com



You buy 10 trees at a local nursery.
How do you plant your 10 trees in 5 rows
with 4 in each row?



INTERSOLV

© Games Publications, Inc. Reprinted with permission of Games Magazine.

The object is to discern a familiar word, phrase or saying from each arrangement of letters and symbols. For example, #1 below depicts "a house divided."

	HO USE	W S R S R S R S R S R S R S R S R S R S	MIND		
	4 CCCCC	itself	HAD		
on he	7 looking	iickety	George Gilbert Geoffrey Gerald		
	10 GRAND	NIGHT	OHIOWA		
	Wad	wh ey we igh	AT WINDMILLS		



www.intersolv.com 1-888-625-3286

Briefs

Frame-relay help

Sync Research, Inc. in Irvine Calif, last week announced plans to integrate circuit management technology with its frame-relay access devices. Sync Research gained the circuit management technology in its recent acquisition of TyLink Corp. Users of Sync Research's Frame-Node devices and software will be able to analyze traffic and conditions and collect reports via a browser.

Reports via Web

New Dimension Software in Irvine, Calif., last week released an optional Internet reporter for Control-O/ PC, a tool for consolidating the management, automation and control of diverse servers. Now systems managers can support MVS. AS/400, VAX/VMS, Unix and Windows NT platforms from a browser interface and from the designated management console. The WebShout option builds a Windows NT-based server that downloads reports generated by diverse servers for viewing and modification from a World Wide Web browser, Pricing for the package starts at \$23,650.

Juiced modems rival ISDN as the link of choice

By Kim Girard

Faster modems slated to arrive next year will provide an interim alternative to ISDN while users wait for even faster technologies — cable modems and ADSL — to reach the market.

New 56K bit/sec. modems from several vendors promise double the speed of 28.8K bit/sec. models.

able in many areas

"There are a lot of installation hassles with ISDN," said Bill Butler, president of Telelink Corp., an independent service provider in Nashville. "It's supposed to be flexible, but you need different setups for telephone, videoconferencing and data."

The new modems will enable users "to taste how pleasant it is" to cruise the World Wide Web at at speeds of 1.5M bit/sec. to 6M bit/sec. ADSL is 200 times faster than analog access and 90 times faster than ISDN.

Although many carriers are conducting ADSL trials, none has deployed the service on a large scale.

"It's a great interim path until ADSL or anything else becomes available," said Ernie Raper, a senior market analyst at Vision Quest, a marketing consultancy in Moorpark, Calif.

"Once this gets out there, within a 12-month period, you will see it become the modem of standard." Raper said.

He said the modems should have a life cycle of about three to four years before ADSL and cable modems hit the mainstream.

Search for speed

U.S. Robotics Corp. recently announced its X2 line of 56K bit/sec. products and outlined a plan to upgrade users.

With the new modems, users can send requests for information on copper lines, and then independent service providers blast data back on higher-speed digital links.

One user taking a wait-and-see attitude was Gary Troutman, corporate development director at Georgia Institute of Technology in Atlanta. Modems can provide a great interim path until ADSL or anything else becomes available.

— Ernie Raper, senior market analyst, Vision Quest

"The proof is in the pudding," he said, adding that he is always looking for more speed. "I need to try it and see how it works."

But one analyst was skeptical of the 56K bit/sec. technology and all tools to boost online access.

"I don't think you'll find people standing out on the sidewalk waiting for the modem to come by because they'll soon hear from their peers that the functionality doesn't deliver," said Joanne Pratt, a telecommuting consultant in Dallas.

Users need better phone lines and service, Pratt said, not better modems.

U.S. Robotics will offer customer modem upgrades in January and modem pool and access server upgrades in February.

Lucent Technologies, Inc., Rockwell International Corp. and Motorola, Inc. also intend to offer 56K bit/sec. products next year.

Modems initially are expected to cost \$100 to \$200, with prices dropping within a year to \$100, according to Raper.

The speed food chain Receives at 56K bit/sec. Sends at 28.8K bit/sec. Users need only the modem Sends and receives at 128K bit/sec. Users need extra lines Not available everywhere ADSL Receives at up to 6M bit/sec. Sends at 64K bit/sec. Not widely available until at least mid-1997 Users will need a special modem

Operating

systems

That is still slower than the 128K bit/sec. of Integrated Services Digital Network (ISDN), but the spread of ISDN has been limited by several factors.

ISDN requires new telephone lines, is subject to wide price variations depending on where the user lives and simply isn't availdouble-speed and "whet their appetite for the real deal" of Asymmetric Digital Subscriber Line (ADSL), said Kieran Taylor, broadband analyst at TeleChoice, Inc., a consultancy in Verona, N.J.

With ADSL, a user can use regular copper phone lines to send data at 64K bit/sec. and receive it

Jury still out on Windows NT 4.0

CONTINUED FROM PAGE 53

The Merrick Printing Co. in Louisville, Ky., said, "Windows NT 4.0 works really well." He said he hasn't encountered any particular kinks in three months of pilot testing at the company.

"As a precaution, though, I'm going to wait until after this first Service Pack has been out before I deploy [Release] 4.0 on my production networks," Merrick said.

Smooth operator

Wayne Stein, a project manager at EDS in Detroit, similarly reported few glitches in his firm's Windows NT 4.0 migration.

"We're very pleased. Windows NT 4.0 has lived up to our expectations," Stein said.

EDS will oversee the rollout of

Windows NT Server 4.0 to 8,500 General Motors Corp. automobile dealerships nationwide, he said.

But some users said they have uncovered some flaws.

"I've encountered more 'Blue Screens of Death' on Windows NT 4.0 than in prior versions of the open of the open weeters. And Lidon's leaves

system. And I don't know what accounts for it," said David Sheridan, a technical instructor liaison at Tech-Teach International, Inc. in Arlington. Va.

"We have to do more troubleshooting, but I suspect it's either my SCSI adapter or video card," he said.

The company teaches a wide range of classes involving Windows NT and Windows 95 and helps its customers set up their networks.

Ron Milione, professional services technical manager at Systron, Inc., agreed.

Systron is a systems integrator and Microsoft platinum reseller in New York that counts dozens of Fortune 500 firms among its customers. As a large Microsoft

reseller, Milione said he routinely gets Windows NT alpha and beta software well in advance.

"Most of the bugs that I've seen, such as hardware incompatibility issues, installation errors and time-outs involving security parameters, are just sloppy stuff and not major inherent flaws in the underlying operating system kernel." Millione said.

A Microsoft spokesman said the company just released its initial Windows NT 4.0 Service Pack and will "work to resolve other issues in the most timely manner possible."

Don't trip over NT 4.0 hurdles

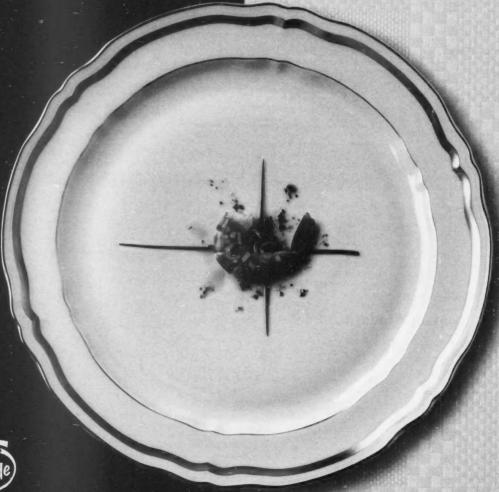
here are several common stumbling blocks that first-time Windows NT 4.0 users may encounter, according to David Sheridan, a technical instructor liaison at Tech-Teach International, and Ron Milione, a professional services technical manager at Systron. They include the following:

- Error messages may pop up when a user is establishing user access rights to certain files and directories. "It takes longer to log in. But system security isn't compromised as far as I can tell," Milione said.
- There is a lack of documentation for the TCP/IP and Point-to-Point Tunneling

- networking protocols.

 There is a lack of documentation for the SysDif and Rollback software installation utilities.
- SCSI controller conflicts may result in system crashes.
- Users have encountered difficulties installing the Exchange Server. Some users reported that the setup kept looping, which prevented installation.
- Memory violation errors sometimes occur during installation of the graphical user interface. When this happens, the user receives an access violation. A hard reboot is necessary to recover the setup parameters. — Lawra DiDio

END STA





PENTIUM PRO

FOR INFORMATION ON OUR "MASTERING YOUR NT TRANSITION" SEMINARS, SEE WWW.AMDAHL.COM

© 1996, Amdehl Corporation. Amdehl is a registered trademark and EnVista and LVS 4500 and BRING US YOUR Business Machines Corporation. Windows NT is a registered trademark of Microsoft Corporation. The Intel Inside

No matter how much you spend establishing your IT infrastructure, your end-user could still be starving for critical information and data access.

No problem. Whether it's System/390, UNIX", Windows NT" or all three running at the same time, Amdahl offers the data center-to-desktop solutions — hardware, software, integration and support services you need to make the most voracious organizations happy.

Take our new EnVista family of NT servers, for example — with today's fastest NT-to-mainframe connections. Or our LVS 4500 storage systems for client/server environments, serving up a terabyte at a sizzling 20,000 I/Os per second. Or perhaps our transparent migration of data from DASD to RAID devices, catering to environments where work is uninterruptible.

To let Amdahl serve up something satisfying for you, contact us at (800) 223-2215 or www.amdahl.com

amdahl

BRING US YOUR HARD PROBLEMS."

HARD PROBLEMS are trademarks of Amdahl Corporation. System/390 is a registered trademark of International logo is a trademark of Intel Corporation. All other trademarks and products are the property of their respective owners

IntraSpection manages network

CONTINUED FROM PAGE 53

"I'm glad to see someone going after the general reporting function, taking an even-handed approach instead of vendors focusing only on their own products," said Bob Childress, a network management analyst at Texas Instruments, Inc. in Dallas.

Large organizations can supplement vendor-specific SNMP consoles that may be costly, complex and confined to the control center, potential users said.

A network analyst at a multistate insurance company, who asked to remain anonymous, said he liked the sound of IntraSpection but said, "We don't have an intranet in place right now to support it."

The prime targets — small to midsize businesses or branch offices — could handle their SNMP monitoring needs through IntraSpection, analysts said.

"The idea of providing free, multivendor management through the Web makes sense because there's a real need to support small and midtier organizations," said Brian Burba, a management analyst at International Data Corp. in Framingham,

But Asante may not be the company to drive such a de facto standard, Burba said. Free distribution modeled after Netscape Communications Corp. will catch attention, but follow-through will be essential, he said.

Management software isn't a core competency for Asante, Burba said, so "jumping from managing your own hardware to everyone else's is a major transition."

The San Jose, Calif., vendor must quickly deliver modules for mainstream gear and get others to write applications for IntraSpection, he said.

The broad support crucial to successful penetration of IntraSpection won't come from internetworking leaders, but it could come from smaller vendors who take advantage of IntraSpection to deliver detailed views of their products, said Greg Howard, an analyst at Infonetics Research, Inc. in San Jose.

SIEMENS

Handling the complexities of your telecommunications system is a lon

The state of the s

Briefs

Legato tackles big backup

Legato Systems, Inc. in Palo Alto, Calif., last week upgraded its Unixbased backup software with support for enterprise-scale storage devices. The vendor introduced Version 4.2.5 of NetWorker for Unix, which runs on IBM's AIX and Sun Microsystems, Inc.'s Solaris or SunOS platforms. Prices start at \$6,000 with two options available. The Silo Support Module lets users take advantage of Storage Technology Corp.'s Automated Cartridge Storage Library Subsystem or EMASS, Inc.'s DAS. One or more Net-Worker servers can attach to the silo or library along with a mainframe, othapplications and other Unix servers. This option costs \$9,500 for up to 128 volumes or \$30,000 for unlimited volumes. The High-Speed Device Support Module costs \$6,500 per server.

Testing software added to Network General suite

Network General Corp. this week will add network performance testing software to its Total Network Visibility line of management tools. Network General in Menlo Park, Calif., will sell and support Chariot from Ganymede Software, Inc. in Research Triangle Park, N.C. Chariot can help network managers perform customized, repeatable tests to verify the performance of a network or gauge the load of a client/server application. Pricing starts at \$9,000.

The Enterprise Network

New Products

Network Peripherals, Inc. has announced three NuCard Fiber Distributed Data Interface (FDD) Sbus network adapters for Sun Microsystems, Inc.'s Ultra systems and Netra servers.

According to the Milpitas, Calif., company, the FD450 series includes a single-attach Sbus multimode fiber card, a dual-attach Sbus multimode fiber card and a single-attach Sbus unshielded twisted-pair (UTP) card. They were designed to give users high-speed connectivity — up to 100M byte/sec. among servers, workstations and segments.

Pricing starts at \$995 for the UTP card; \$1,995 for the single-attach card; and \$2,995 for the dual-attach card.

Network Peripherals
(408) 321-7300
www.nbix.com

Platinum Technology, Inc. has announced Netcessities, a development tool

set to model, build, test and deploy enterprisewide intranet applications.

According to the Oakbrook Terrace, Ill., company, Netcessities is an open tool set, so developers can include outside technologies or tools.

Among the tools included in the set are Paradigm Plus for object-oriented design; ObjectPro, which uses C++ code generation; and Final Exam, an automated testing environment.

Pricing for Netcessities starts at \$2,995.

► Platinum Technology (630) 620-5000

www.platinum.com



The Linksys Group's EtherFast 12-Port Stackable 100Base-TX Hub

The Linksys Group, Inc. has announced EtherFast 12-Port Stackable 100Base-TX Hub for network operating systems.

According to the Irvine, Calif., company, the 12-port hub allows a maximum of five other stackable hubs to be directly linked together.

Pricing starts at \$1,799.

Linksys Group (714) 261-1288 www.linksys.com

Acclaim Communications, Inc. has announced EtherWAN, a family of network switches that fuse switching with routing.

According to the Santa Clara, Calif., company, EtherWAN supports as many as 24 100M-bit ports and wide-area network interfaces.

Included in the family of switches are Acclaim 1024-2ES, which offers 24 10M-bit switched Ethernet ports, two 100M-bit switched Ethernet ports and an optional WAN interface; and Acclaim 2024 FES, which offers 24 10/100M-bit switched Ethernet ports.

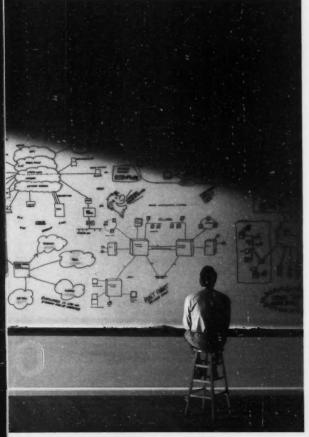
Pricing for Acclaim 1024-2ES starts at \$4,995.

Pricing for Acclaim 2024 FES starts at \$14,400.

Acclaim Communications (408) 327-0100 www.acclaiminc.com



ely job. / Mind if we join you?



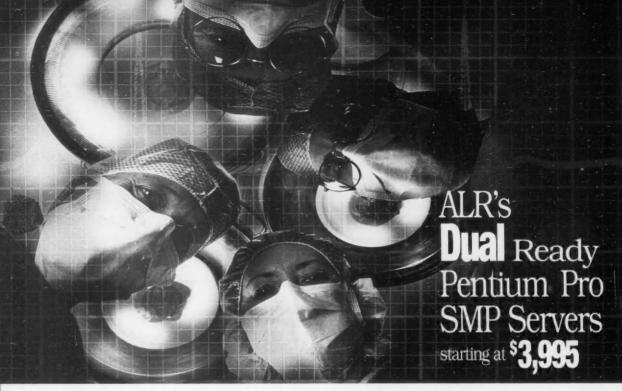
Notice how complicated your job's been getting lately? At Siemens Business Communication Systems, we've noticed, too. And more than that, we're doing something about it.

Our product line isn't just broader than most. It's also more flexible. So whether you're dealing with a growing work force, the need for greater capabilities, expansion to international markets or the incorporation of new technologies, you'll deal with it better with us by your side.

Granted, it's nice to work with a firm that's provided open solutions – from WANs, PBXs and CTI to call centers, wireless and video – for more than 1,000,000 organizations. But day-to-day service is really the name of the game. Here, too, we won't leave you feeling alone. You'll find our response lightning-fast and proactive, our support incredibly targeted, and our approach to problem solving relentlessly inventive.

These may seem rather bold claims. But actually, we're hoping you'll decide to call us on them. And you can do that by calling us at 1-800-765-6123, ext. F16. Or, if you'd prefer, visit our Web site at www.siemenscom.com. Go ahead. You'll be feeling less lonely in no time at all.

Challenge Us."



But doctor, it's got two!



Networks come in all shapes and sizes, and so do these dual processing Revolution servers.

Dual processor ready! Meaning, these systems deliver enterprise class power for the price of a departmental server. But dual processing isn't all that sets these systems apart. DUAL redundant power supplies.* DUAL PCI bus technology. Error checking and correcting memory. One-Gigabyte system memory expansion.

Numerous hot-spare storage subsystems and RAID solutions. And with both tower and rack-mountable configurations, these systems are ideal for a variety of network applications. Plus, ALR's "built-in" InforManager server hardware management provides the security you need to protect your sensitive, mission critical operations.

And if you need even more power, ALR's award-winning family of QUAD processing Revolution servers delivers the highest level of performance available on the PC platform to date.

Even ALR's service and support exceeds the norm. All these systems are backed by a 5 year/36 month warranty with



With a choice of single or dual processing, these servers have the power you need at a price you can afford.

a full 3 years of free on-site service. That's more the twice the coverage of most competitive systems.

Seeing is truly believing. So, for the location of the ALR reseller nearest

1-800-444-4ALR (ref# 5805)

























Recomment and Revolution MP Pro come clandard with redundant power supply, optional on Revolution DUAL

ALR to com their intersection - British Price - British Price

The Internet



Most 'net sites aren't useful, critics say

By Matt Hamblen

A lot of businesses are setting up shop on the World Wide Web, but many critics find the majority of sites ineffective in tapping the commercial potential of the Web.

Webmasters should worry less about the technology of the Web and concentrate on giving surfers reasons to buy and reasons to return to a site, observers said.

"It takes less than two hands now to count the really great business Web sites," said Stan Goldberg, director of software strategy service at Forrester Research, Inc. in Cambridge, Mass. And yet Goldberg said he is "very

Internet commerce

keen on the Internet as a business medium." The emphasis lately has been on quality graphic design, animation and streaming audio and video - not on sales.

"People using the Web don't give a damn about technology. They care about value and solutions,' said Phillippe Bouissou, director of Internet commerce and services at Apple Computer, Inc., at a recent Interactive Multimedia Association Expo.

Return business

How does a business create a Web site useful to customers? The key to a good site - such as Federal Express Corp. (www.fedex.com) and Amazon.com, Inc. (www.amazon.com) sites - is to recognize the customer's need for a satisfying visit to the site, said Rick Smolan, a photojournalist who recently created 24 Hours in Cyberspace, a book and CD-ROM that include generous examples of business uses of the Web.

Useless, page 62

Netscape price change may be costly

By Kim S. Nash

etscape pricing is getting more complicated. As part of a series of new products and strategic changes meant to help the company compete with chief rival Microsoft Corp., Netscape Communications Corp. recently outlined plans to charge by the user on four of its new SuiteSpot 3.0 servers. The products will ship in the first quarter next year [CW, Oct. 21].

Pricing remains the same for the Navigator browser, which is part of a bundle of client-side packages called Communicator.

And some SuiteSpot servers won't have per-user fees attached (see chart. page 62).

The old way

Mike Homer, director of marketing at Netscape in Mountain View, Calif., said the per-user pricing is just one of several ontions available

Information systems buyers also can choose the old plan of \$995 per server for up to 100 users, Homer said. But per-user pricing kicks in for shops that want to link more than 100 users to Netscape's Collabra groupware and Messaging electronic-mail servers.

The new plan will likely mean higher costs for large intranets than under perserver pricing.

Netscape officials said the company's pricing plan is similar to those of Microsoft and Lotus Development Corp.

Those vendors have per-user pricing models for their competing groupware products, Microsoft **Exchange and Lotus Notes**

The new fees, which harken back to client/server pricing models rather than newer Internet-based models, disappointed but didn't surprise several

"While we associate Netscape with the wild and near-free Internet of the past, the reality is they are a business just like everyone," said Dave Lewis,

Countrywide's Jeremy V. Gross says Netscape's new pricing schemes won't slow plans for large intranets

principal webmaster at Pacific Bell in San Ramon, Calif. The new fees probably won't slow plans for large intranets, said Jeremy V. Gross, chief technology officer at Countrywide Home Loans, Inc., a large mortgage broker in Pasadena, Calif.

The compelling need for knowledge sharing ... and to interconnect [with outside partners] will ultimately override any second-guessing of intra-

Netscape, page 62

Web site keeps up with *Times*

By Mitch Wagner

The World Wide Web site for The New York Times fits the buttoned-down character of a newspaper that still prints black-and-white photos on page 1.

Other sites on the Web dazzle the visitor with cluttered arrays of brightly colored graphics and herky-jerky animations. But the Times site presents readers with a succession of black-and-white rectangular graphics files, laying out the day's news in the newspaper's characteristic blocky headline typeface.

Like the newspaper, the uncluttered Web site is just the simple face on a sophisticated operation. The Times, which has had a site

on the Web since Ianuary, built Excalibur, a custom information systems infrastructure to manage the content on the Web. The organization also is looking into customization features and subscription services.



The custom-made Excalibur system links the Times Web site to the print edition's servers

The lack of flashy special effects is not likely to hurt the Times, said Melissa Bane, an analyst at The Yankee Group in Boston.

"The key to a news site is simplicity," Bane said. "If you confuse the user

once, they're never going to come back. I'm not a believer in putting all the bells and whistles on a

Rather than special effects, the big challenge for the Times is the same as that for other news sites on the Web - to make money (see story, page 62).

The Excalibur system was designed to resolve two problems: how to import stories and photos from the proprietary publishing

Newspaper, page 62

Useless sites slow commerce

CONTINUED FROM PAGE 61

"Smart companies are figuring out that [the Web] changes the whole relationship with customers," Smolan said. "Audiences want to know what your product will do for [them]."

Amazon, for example, offers information about 1 million book titles and lets users order any of them by electronic mail at a discount. Users can register a preference for an author or topic, and they will be notified by E-mail when a relevant new title arrives.

The FedEx site helps users fill out and print a shipping tag and request pickup automatically.

Reply, please

It isn't enough to post a catalog or a Web discussion forum, Goldberg said. When somebody registers at your site, you need to send an acknowledgement to show that you're listening and perhaps follow up with a notification of a new product in which they would be interested. A company also has to answer E-mail promptly. "The beauty of the Web is that it's interactive, and if you're not going to interact," it won't be effective," Goldberg said. Most companies have ignored that opportunity. A recent study by Matrixx Marketing, Inc. in Cincinnati shows that nearly half of 100 Fortune 500 companies with Web sites polled by Matrixx had no E-mail response capability. Of those 100, only 17 responded to an E-mail inquiry.

One way of giving something to Web customers borrows from the newspaper world.

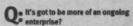
City Sports (www.citysports.com), a sporting goods chain in Boston, has drummed up business by posting coupons on its site that Web visitors can print out and bring to its stores to save on athletic gear purchases. Shayne Gilbert, president of Silverweave, Inc. in Boston, which created City Sports' Web page, said the coupons bring in regular business. "It amazzes me that every retailer is not doing it," he said.

Memo from cyberspace

Rick Smolan created the book "24 Hours in Cyberspace" as a photographic journey through the nether reaches of the Web. He picked up the following insights along the way:

• What should corporations de to make their Web sites successful other than use good design or technical tricks?

There needs to be a compelling reason to come back every day. . . . It sounds obvious, but sometimes sites have a sense of being a ghost ship. There needs to be a really clear feeling to the audience that there is something useful [there].



Yes. You need a full-time person [managing the site], and I'd also suggest people don't assign their most junior, expendable person, which is often the case. . . . I don't think for a lot of companies it's a high priority. People are just sort of imitating what's out there and [what they end up with] doesn't really apply to their business.

Q. Do you have a sense that very many large companies are creating good sites?



A I've visited enough sites I didn't like where it was obvious that somebody had not spent a lot of time thinking about it. . . . [Designers] think in order to be competitive they need to have spinning icons or lava scripts, and often what their audience wants is a lot simpler than that. Being appropriate is more important than [having] the latest cutting-edge thing.

e is there a danger a company could look too crassity commercial on the Web?

I think no amount of money is going to

I think no amount of money is going to make a Web site interesting or something people would go back to. It's self-governing. If you make it crassly commercial, they won't come back. The successful businesses are people that are thinking differently. . . . Art dealers are sharing resources online. . . . We featured a family selling hot sauces that went on the Web and now has a worldwide audience for it. It is amazing.

- Matt Hamblen

Netscape's new pricing

Course out the same

\$49 for Navigator, Messenger, Collabra, Conference, Calendar or Composer



\$79 for all packages, plus development

SUITESPOT 3.0 SERVERS

\$995 for Enterprise, FastTrack, Catalog, Proxy, Messaging, Collabra, Conference, Calendar, or LiveWire Pro



 \$3,995 for a bundle of any five of the nine servers
 \$005 each for

 \$995 each for Messaging, Collabra, Conference servers only, plus \$69 per user*

*Per-user fee is \$99 when Communicator client packages are added

Netscape pricing change

CONTINUED FROM PAGE 61

net projects," Gross said. He plans to go ahead with a massive hybrid Internet/intranet application anchored with Netscape products [CW, Aug. 12]

But IS managers who don't like new pricing plans for intranet products may have an easier out than in client/server days.

Unlike client/server gays.
Unlike client/server products
that catered to a specific platform
or set of proprietary technologies,
World Wide Web products are
built on established, public stan-

That makes them easier to swap — at least in theory, said Steve Whan, corporate webmaster at BC Hydro and Power Authority, an electric utility in Vancouver.

"As long as intranet computing is standards-based, I have options for alternatives," Whan said.

Every part of the system can be replaced, said Nina Lytton, an analyst at Open Systems Advisors in Boston

"You can always find a second source." she said.

Senior editor Mitch Wagner contributed to this report.

Newspaper links Web site with print edition

CONTINUED FROM PAGE 61

system used for the print newspaper and how to coordinate the efforts of the team that puts the stories online.

Just getting ahold of electronic versions of Times stories proved to be a difficult task, said Beniamin Graboske, group director of systems and software design at The New York Times Electronic Media Co., the wholly owned subsidiary of The New York Times Co. that produces the Web site. The editors and reporters who compile newspaper use a 15-yearold proprietary publishing system from Atex, Inc. The system coordinates writing, editing and formatting stories. It has hundreds of users, it's clunky and tempermental - and it's mission-critical. It can't go down.

So the IS staff had to find a way to tap into the text on the Atex system without jeopardizing production of the print publication.

Producers import text files to Excalibur's IBM RS/6000 server through a custom-built gateway that runs on Apple Computer, Inc. Macintosh systems.

Excalibur producers view the master text in Web browsers and add Hypertext Markup Language code to publish it to a Web site. The original text files remain pro-

tected on the Atex system.

The interactive edition's editors have full access to all Atex servers, which lets them browse through the print edition before it hits the presses. It would have been easy for the producers to

download files from the Excalibur servers, work on them locally and upload the results to the Web site. But that wouldn't have allowed the *Times* to maintain version control and keep track of file locations, Graboske said.

Where's the cash?

Putting a daily newspaper online might be miraculous enough for some people, but it isn't enough for The New York Times.

After all, the *Times* is a business. It needs to make money.

Most online newspapers and magazines that distribute their content for free rely on advertising for revenue.

Some, such as The Wall Street Journal, are open only to paid subscribers.

But the Times plans to broaden its revenue base by offering online searches of its back issues since 1981 for \$1.95 per article, said Benjamin Graboske, group director of systems and software design at The New York Times Electronic Media.

But why should users visit

the newspaper's Web site when they can buy the paper for a dollar just about anywhere in the U.S.?

Customization — giving each visitor to the Times site a different view of the paper based on that visitor's own interests — could be the key, Graboske said.

Someone interested in financial news will see those stories first, for example.

"You really have to go beyond just 'repurposing' existing content to customize information delivery. It needs to be not just highly tailored, but also provide the user with notification of when news comes in," said Michael Goulde, an analyst at Patricia Seybold Group in Boston.

- Mitch Wagner

Get on the fast track.

#1 IN DATA
WAREHOUSING

Get your free copy of Data Warehousing: Factors for Success.

Visit our web site at www.ncr.com/service/addw or call toll-free 1-888-NCR-7111, ext. 25. Or complete and mail this card.



	The second		The second second		
			- 111		NO POSTAGE NECESSARY
				1	IF MAILED IN THE NITED STATES
				O	NITED STATES
				_	
		DUCINECC	DEDIN M		
	18238	BUSINESS FIRST-CLASS MAIL PER	REPLY MA	AIL =	
	N 5 . S.		E PAID BY ADDRESSEE		
		Peter Boulter, Dire NCR Worldwide	ector of Marketing	_	
		PO Box 9345			
	18436	Framingham, MA	01701-9653		
	1154.7				
	1 W 3 1				
				11 111 11	
			- -	and double label	

We build data warehouses faster than our competition.

SO YOU CAIL Move faster than yours. NCR consultants can build in months what it takes others more than a year to construct. But we're more than swift. Your NCR data warehouse will also be actionable. Built to grow with you. Serviced by experts with the confidence, experience and methodologies to deliver real business value. And designed to capture, analyze and present customer information that keeps you in the fast lane. Our brief, *Data Warehousing: Factors for Success*, explains more. For your free copy, please visit our web site at #1 IN DATA www.ncr.com/service/addw or call toll free I-888-NCR-7111, ext. 15. WAREHOUSING



New Products

Genesys Software Systems, Inc. has announced GenNet, a complete payroll service on the Internet.

According to officials at the Methuen, Mass., company, GenNet lets companies process payroll over the Internet. The product comes in three tiers, including one that provides tax reports and another for tax denosits.

Pricing starts at \$2.95 per payment done with GenNet.

► Genesys Software Systems (508) 685-5400 www.genesys-soft.com Information Access Co. has announced AutoSite, a 30,000-page online buyer's guide on new and used cars and trucks.

According to officials at the Westboro, Mass., company, AutoSite customers can be connected to dealers that subscribe to the service to get competitive purchase prices.

Thirty days of unlimited access to Auto-

Site is available for \$9.95.

Information Access (508) 870-5955

Artisoft, Inc. has announced Artisoft Info-Fast Version 1.0 fax-on-demand software.

According to the Tucson, Ariz., company, InfoFast provides users with 24-hour access to World Wide Web documents and faxes via fax or phone.

It was designed with a drag-and-drop interface and one-button Hypertext Markup Language document synchronization to translate Web pages into faxable images, company officials said.

Pricing for Artisoft InfoEast Version 1.0 starts at \$1,995.

Artisoft
(520) 670-7100
www.artisoft.com

Farallon Communications, Inc. has announced Netopia Integrated Services Digital Network modems to support Windows and Macintosh users.

According to the Alameda, Calif., company, the product has a serial port speed of 230K bit/sec. and up to 4-to-1 data compression.

The price is \$400.

Farallon Communications
(510) 814-5000

www.farallon.com

Site Technologies, Inc. has announced SiteMarks, bookmark management software for Windows that provides users with a unified set of bookmarks for Netscape Communications Corp.'s Navigator and Microsoft Corp.'s Internet Explorer browsers.

According to the Durham, N.C., company, SiteMarks allows Navigator to access bookmark files used by Internet Explorer.

SiteMarks costs \$29.99.

Site Technologies, Inc. (919) 416-3113

www.sitetech.com

Solutionsoft has announced WordToWeb, an add-in to Microsoft Corp.'s Word Version 7.0 or later that automates the conversion of Word documents to Hypertext Markup Language pages.

According to the Sunnyvale, Calif., company, WordToWeb automatically converts Word graphics to graphics interchange format and can generate thumbnail links for large graphics to minimize download time.

WordToWeb costs \$279.

► Solutionsoft
(408) 736-4013

www.solutionsoft.com

Integrated Micro Solutions has announced TwinTurbo 128M8, a video accelerator for Peripheral Component Interconnect-based Power Macintoshes and compatibles.

According to the San Jose, Calif., company, the accelerator has a 128-bit effective memory bus and 8M bytes of video RAM.

The price is \$899.

Integrated Micro Solutions (408) 369-8282

www.integratedmicro.com



There are a lot of factors to consider when you're buying quality SPARC-based servers and workstations. You want power, you want speed, and you want all this performance for the best price. What you don't want is technology that's outdated as soon as it's up and running. And buying a big name is no guarantee of protection.

Luckily, there's a brighter choice. Axil. The Axil Ultima 1 and Ultima 2 systems feature a full range of UltraSPARC processors and up to 2GB of RAM. Not only that, there's our unique modular chassis design that makes upgrading simple. As technology evolves you can either upgrade your processor, add another for dual processing, or change the motherboard for even faster performance. So you get investment protection built in.

If you want us to shed some light on our servers and workstations, just call 1-800-284-AXIL or visit us at http://www.axil.com. And let us tell you all the reasons we outshine the competition.



Computer, Inc.

A Hyundai Company

#1996 Axil Computer Inc. All product names and iradrements and registered trademarks are the property of their respective owners.

Software Health Check Questionnaire

To provide an accurate analysis of your software environment, we need some information on the applications you use. First, choose a key business application that is in development or has been recently developed. Then, for each of the following questions, select the statement that best describes the software by filling in the circle along the scale. If a question is not relevant, skip it.

1. Which statement best describes your approach to implementing the application?	12. What are the skill levels of the staff developing the application?			
4 0 4 0 4 0 4				
Purchase packaged Purchase application, Hire contractor(s) to Write custom application application, including any major develop application using our own staff	Lack necessary skills Some skills in place, additional Staff well-skilled in in required technologies training and/or new staff required required technologies			
minor modifications modifications 2. How many users will be using the application?	13. What operating system(s) does the application run on or interface with? Check all that apply:			
	IBM (or compatible mainframe OS) OS/2 WARP			
3. Within your company, who uses this application?	OS/400			
A workgroup Several small units A major Many major units. The entire business unit organization	14. How many people does your company employ at all locations?			
4. How geographically concentrated are most of the users working with the application?	15. What is the primary industry of your company?			
Highly centralized Mostly centralized Dispersed, at Dispersed, disconnected in one location fixed locations within mobile users	16. Which statement best describes your approach to the reuse of corporate data			
your company (such as sales force)	$-\phi$			
5. In what way will customers and/or suppliers outside of your company work with this application?	Data tends to be We replicate data We provide tools to help We have implemented users locate data based mu single application its support new users locate data based mu or plan to implement a its context and meaning comprehensive data warehouse approach			
Application not Via Electronic Via the Internet,	17. Which statement best characterizes your plans for ensuring the integrity and reliability of applications and data?			
for users outside Data Interchange (EDI) linking customers/suppliers my company to company resources	A A A A A			
6. How centralized or dispersed is the data used by the application?	Keep it centralized Distributed, with an emphasis on Distributed, but using automated			
b. How certifiatized of dispersed is the data used by the application?	data security and recoverability licols to ensure reliability, performances, and maintainability			
Stored centrally Stored centrally in Stored in multiple locations in a single database multiple databases in multiple databases	18. How would you categorize your approach to adopting new technologies?			
from multiple vendors from multiple vendors	$-\phi$			
7. What are the characteristics of the data processed by the application?	Adopt them after Adopt them once "Leading edge" but not Be the first company the technology his "bleeding edge" to try new technologies widespread standard be en demonstrated to work by others			
Small volumes Small volumes Large volumes Large volumes processed infrequently processed frequently processed frequently	19. Describe your view of the role of information technology.			
8. What is the size of the database used by the application?				
+ - + - +	Expense to control Service or support function Strategic asset critical to company's success			
$-\phi$				
Megabyte Gigabyte 50 Gigabyte Terabytes	20. What is the influence of end users on I/S decisions?			
9. When a user accesses data, how up-to-date does it have to be?				
	Users make most decisions I/S and users are about equal I/S makes must decisions			
No specific requirements Daily or weekly updates Hourly updates Up-to-the-second, instantaneous	Thank you for taking the time to complete the Software Health Check Questionnaire. Please fax it to us at 1 800 795-9599, or visit us			
10. What is the architectural design of the application?	at www.software.ibm.com/is/enterprise/ if you'd like to fill it out on the Web. Please allow two weeks to receive your report.			
Runs mainly from Distributed dutationses Business logic distributed Databases and business single host system on multiple platforms on multiple platforms logic distributed	Name			
11. What is your approximate budget for developing the application (including new hardware, software and consultants)?	Company/Address			
	Phone number			
$-\phi$				
<\$1,000 \$10,000 \$100,000 >\$1,000,000				

The IBM home page is located at www.lbm.com. IBM, OS/2, and OS/400 are registered trademarks and Solutions for a small planet is a trademark of International Business Machines Corporation. Windows and Windows NT are registered trademarks or Microsoft Corp. All Other product names are the property, trademarks or registered trademarks of their respective companies. © 1996 IBM Corp. All rights reserved.



needs? Send for your free Software Check, and you'll see how to The health of your business relies on Software, Yet how you be sure the choices you make today o ensure your right for your changing will be

ROMN Corporation, a worldwide consulting and research firm, is expert at helping companies with strategic, and see how you compare to your industry's best practices, fill out and return the questionnaire on the back of

software continues to pump new life into your

computing and telecommunications issues. To get your free personalized Software Health Check this page, or stop by www.software.ibm.com/is/enterprise/. And we promise, this won't hurt a bit.

Solutions for a small planet



Great. Just what the business world needs. Another buzzword.



IDS CoSourcing" service turns business goals into realities. Some buxxword.

CoSourcing relationship is about us working with you to create extraordinary business results. It's about us being accountable for improving your business performance.

We—and our colleagues at our management consulting arm, A.T. Kearney—help you set measurable business goals and develop strategies to achieve them. Then, through the innovative use of information and technology, we work with you to implement those strategies.

EDS follows every endeavor through to its end, from strategic planning to the final realization of your business goals. And we've got plenty of examples of that. Working with EDS: Saab was able to cut the time it took to build a car in half, and quality improved messurably; a company called First Virtual devised and implemented a safe way for shoppers to use plastic over the Internet; and in one year, Taiwan went from having 60% of its citizens covered by health insurance to 100%.

To learn more about EDS CoSourcing service—and to find out why we'd like to discuss tying part of our compensation to your business results—contact us at 1-800-566-9337 or at info@eds.com. Or visit us at http://www.eds.com.

A more productive way of working

EDS

Auto parts retailer uses Windows NT tool to jump-start a warehousing project, 71

Corporate Strategies

IT to boost resort sales

By Thomas Hoffman

ince joining Premiere Resorts International in April. Ken Gay has had little time to schuss the slopes of Steamboat Springs, the Colorado ski area with trails a scant 20 vards from his office.

That's because Gay, director of information systems at Premiere, is a one-man IS crew who has been busy jetting among the property management company's 34 resorts from Colorado to Kauai, Hawaii.

Premiere is installing a centralized property management system from Springer-Miller Systems, Inc. in Stowe, Vt., to help automate reservations processing and put Premiere's guest information to more effective use.

Gay said the software was better designed to utilize customer histories than other systems Premiere evaluated. For example, resorts that used manual reservations in the past had to rely on Pre-







Premiere Resorts' new property management system was designed to help the company cross-market rooms in its other properties to guests who have stayed at one or more of its resorts, including (from left) The Charter. Whaler's Cove and The Lodge

miere's central reservations office to take bookings over the telephone. "Central rez" would fax those reservations to a resort, where front-office staff would reenter the reservations in the existing property management system, Gay said.

With the new IBM RS/6000-based systems, the resorts will be able to accept the reservations themselves, eliminate dual entry and improve productivity by 30% to 40%, Gay said.

Plus, guest history information can be

reused to cross-market special events to guests who have stayed at one or more resorts. That is the kind of micromarketing that Premiere wasn't able to do before with a "collage" of computer systems, Gay said.

Other resorts usually rely on third-party vendors and clearinghouses to crunch guest history data for them, said Robert Langsfeld, principal associate at Langs

feld Fazio & Associates, a travel management consultancy in Incline Village, Nev. But most resorts "have found it costprohibitive or resource-prohibitive to do it themselves," Langsfeld said.

Gay said Premiere expects to spend less than \$2 million over the next two years to roll out the IBM RS/6000 servers and application software to its 34 properties. Springer-Miller is doing the installs. Premiere Chief Financial Officer Tom

Resorts, page 71

Target: Electronic spies

FBI beefing up corporate computer security alert program

FBI Director Louis Freeh says U.S.

allies can use high-tech information

'in competition against U.S. firms'

By Gary H. Anthes WASHINGTON

The Federal Bureau of Investigation might seem to have its hands full investigating underground

militias, exploding airplanes and pipe bombs. But the agency is nevertheless beefing up its efforts to help reduce electronic corporate espionage.

The FBI is expanding a program that currently faxes threat alerts to roughly 10,000 corporate security and law enforcement officials to include 25,000 subscribers, said Jonathan Binnie, chief of national security training at the FBI in Washington (www.fbi.gov).

The service can help users avoid attacks against their information systems and respond to attacks that are under way, the FBI claims. Security experts say many victims never become aware of network intrusions.

Binnie said any company may subscribe to the

service, which is part of the FBI's Awareness of National Security Issues and Response (ANSIR)

David Starr, chief information officer at ITT Corp. in New York, said he hadn't heard of ANSIR

but added, "It's a great idea. I want all the heads-up information I can get, either to respond to a threat or try to avoid it."

Starr said he gets information about threats from several sources, but none from the U.S. government.

Elusive threats

"Computer security is too intangible for many companies," said Rebecca Duncan, senior analyst of information security at Datapro Information Services Group, Inc. in Delran, NJ. "In a computer crime, nothing may be physically touched; all you may see is

your competitor coming out with a product similar

FBI, page 71

CIOs swap tips on Web forum

Looking for tips on how to write a comprehensive request for proposals for a new data warehouse?

Need some fast facts on Internet usage for an afternoon meeting with senior management about electronic commerce?

Maybe you're just curious about what your peers at other companies are up to on the

intranet front.

Those are the kinds of questions the Cambridge Information Network (CIN) was designed to answer for senior information technology strategists (www.cin.ctp.

Launched last week by Cambridge Technology Partners, Inc., a systems integrator in Cambridge Mass., the free Internet-based service provides a forum for chief in-

formation officers and other CIN members to discuss technology and business issues.

Becoming a member involves completing an online registration form, which takes about three to four days to process

"Basically what we're looking for are people who are responsible for

the strategic delivery of IS," said CIN publisher

founder Paul McNabb. About 50 people - mostly CIOs, vice presidents of networking and directors of application development and delivery - logged on during a monthlong beta period, he said.

Visibility

What Cambridge Technology Partners gets out of the service is plenty of exposure and an increased potential for future business.

CIO forum, page 71

(www.computerworld.com) OCTOBER 28, 1996 COMPUTERWORLD

Online strategies

THERE'S ONLY ONE PROBLEM WITH BUYING
A PC DESIGNED FOR TODAY'S BUSINESS APPLICATIONS.
IT'S CALLED TOMORROW.





Intel Pentium Pro Processor up to 200 MHz

16 MB or 32 MB RAM Standard

2 GB IDE or SCSI hard drive

PCI Accelerated 2D and 3D graphics

Microsoft Windows NT

3 year limited warranty

INTRODUCING THE POWERMATE PROFESSIONAL SERIES WITH PENTIUM® PRO PROCESSOR.

These days, trying to buy technology for your company is like trying to shoot a moving target. If you don't set your sights far enough ahead, you'll miss. Fortunately, the NEC PowerMate* Professional is at the leading edge of the technology curve. With advanced technologies like a 200 MHz Intel Pentium Pro processor and Microsoft Windows NT*, the PowerMate Professional is just the long-term investment your

company has been looking for. Power hungry 32-bit office applications, like 3D CAD/CAM and financial modeling, are not a problem for the PowerMate Professional system. And you can maintain full compatibility with all general purpose PC applications. So if you're tired of keeping up with the latest technology, we have a solution: the latest technology. For more information on the PowerMate Professional Series and other PowerMate products, just call 1-800-NEC-INFO, or visit us on the web at http://www.nec.com.

SEE, HEAR AND FEEL THE DIFFERENCE."

NEC

Resorts

CONTINUED FROM PAGE 69

Ptach expects the system to pay for itself three years after all the servers and sites are installed.

Premiere has been on a spending spree in the past few years. It acquired Deer Valley Lodging Co. in Deer Valley. Utah, in June 1994 and bought seven property management companies in Sun Valley. Idaho, in April 1995, With those acquisitions came a variety of computerized lodging systems that weren't all automated, Gay said.

To find an automated property management system that met user requirements at different resorts, Ptach put together a team of end users from several hotels before Gay came on board. Gay said that strategy helped him gain immediate buy-in from users "and a true sense of ownership" on

Jodie Gingrass, director of cor-

Resort secrets

Premiere Resorts, a closely held London, declined to disclose revenue figures.

porate development at Deer Valley Lodging who has been part of that user group, said the team approach has worked well. In the past, a technician would install the software and add a very narrow set of functions, she said. "We found something that works best for all users," she said.

Premiere's user-centric anproach is also effective in placing the responsibility on third-party vendors and consultants - and not Gay - to deliver the goals of their contracts. "This takes property management to the next level" of service, said Richard Moore, associate professor of hotel information technology at Cornell University's School of Hotel Administration in Ithaca, N.Y.

comes not only from information

CIN is an example of how Internet services are moving increasingly toward delivering "people and perspective, rather than just content," said Stan Lepeak, an analyst at Meta Group, Inc. in Stam-

Auto parts retailer cranks up replication

Windows NT tool organizes data for real-time access

By Tim Ouellette

When Marc Dorais needed to jump-start an AS/400 data warehousing effort at United Auto Parts, he turned to a

Windows NT-based replication tool. The tool let the

Montreal auto parts retailer phase in less-expensive Windows NT servers to handle AS/400 database queries. It also gave decision-makers an organized view of crucial data stored in 450 AS/400s spread across 700 stores and distribution

"We eventually want to have all the stores running on Windows NT." said Dorais, a development manager at United, "But before that, we have to have a way to access the AS/400 data in real

Dorais soon will create the first piece of the data warehouse project, a smaller, targeted data mart. which will contain all warranty claims done at United's 11 distribution centers. The data mart will be located on the headquarter's

Data

United is using Rapid Data. software that replicates multiple AS/400 data files into Microsoft Corp.'s SQL Server tables on the

Windows NT server. For example, warranty information stored warehousing at the 11 distribution centers is combined

in one table that contains historical and current information.

More free time

The SQL Server handles the data calls from there, so the AS/400 is free to process the constant flow of data that comes in from various

"We want to try to install a small NT server to handle all the query requests, so performance of the head office AS/400 will improve." Dorais said. "We don't need to upgrade the AS/400, and the price of a strong NT server is still cheaper than upgrading the

And because Rapid Data runs almost completely on NT, Dorais is also freed from hiring developers to program and configure the AS/400, something competing products required. Dorais wanted to focus United's staff expertise on Windows NT because most sites will be running the platform in the next few years, while still accessing data warehouse information stored on AS/400s.

That is a growing reality for AS/400 shops. Analysts said nearly 25% of AS/400 users also have Windows NT machines running in their shops.

By avoiding one CPU-intensive AS/400 function to move data. Rapid Data also saves operators

Fewer steps

Because Rapid Data isolates and replicates only the newly changed data, operators don't have to perform AS/400 journaling, which slows down the AS/400, takes up disk space and requires moving data to tape storage each day, Dorais said.

Open Universal Software, Inc. in Montreal will make Rapid Data generally available next month. It will cost between \$2,000 and

CIO forum

CONTINUED FROM PAGE 69

One of the earliest users is Gordon Ebanks, global director of IS at \$700 million Tambrands. Inc.

"One of the things I found useful is the networking and sharing insights among peers, especially noncompeting peers," he said.

The content is also very focused, concise and timely, which is important because I don't have time to read through all of the [technology trade] periodicals,"

The CIN World Wide Web site is divided into four areas - peers. experts, ideas and vendors which contain information ranging from technology white papers and recent industry conference proceedings to product data from vendors.

The peers and experts areas of the site are interactive. Under experts, for example, users can post specific technology questions, which will be answered by a Cambridge Technology Partners

Under peers, members can particinate in online discussions with colleagues at other firms. A survey of CIOs indicates that could be one of the site's most heavily used features, McNabb said.

"We asked IS professionals where they go when making big purchasing decisions, and the big answer was peer referral. The value of CIN to the IT community but from insight and perspective from their peers," he said.

ford. Conn.

FBI program

CONTINUED FROM PAGE 69

to yours, three months ahead of schedule.'

"Foreign intelligence operations directed against U.S. economic interests are neither unusual nor unprecedented," said FBI Director Louis Freeh at a congressional hearing in February. The end of the Cold War has not resulted in a peace dividend regarding economic espionage."

Freeh said the biggest threat isn't from unfriendly countries such as North Korea.

"Countries traditionally considered allies have infrastructures that allow them to easily [obtain] high-tech information and use it in competition against U.S. firms,"

"ANSIR is the FBI's public voice in national security matters - espionage, counterintelligence, economic espionage and physical- and cyberinfrastructure protection," Binnie said.

Binnie said ANSIR faxes alerts

about once a month. They may deal with specific threats, offer general security advice or provide special information such as key anniversary dates on which terrorists may launch attacks.

Criminal sanctions

Freeh got his wish for new legal tools against economic espionage two weeks ago when President Clinton signed the Economic Espionage Act. It imposes penalties as high as \$10 million and 15 years in prison for the theft of trade secrets. There previously was no specific criminal statute to help the FBI pursue many of the 800 cases of economic espionage by 23 countries under investiga-

Anecdotal evidence suggests economic espionage against U.S. companies is increasing, Duncan said. But because so many computer intrusions go undetected and unreported, it isn't possible to measure the full extent of the problem, she added.

In a recent Datapro survey of 1,337 information security professionals, only 54% of respondents said they had comprehensive security policies, down from 82% in

Duncan attributed the drop to budget pressures that squeeze out security programs and to moves to decentralize computing.

Tips on avoiding security risks

rnst & Young LLP in San Francisco offers the following 10 suggestions for companies that wish to avoid losses due to security risks:

■ Make employees, vendors and contractors sign confidentiality statements.

Back up laptops on a regular

Establish policies and procedures for the use of and downloading of information onto

■ Prohibit users from scripting their user IDs and passwords on desktops used for intranet

• Prohibit scripting of user IDs and passwords on laptops to be used for remote access.

■ Prohibit Internet access for anything other than business

 Make boot-level passwords mandatory for all users.

· Classify all data as to importance and enforce relevant access restrictions

· Lock up or otherwise secure all laptops, desktops and peripherals after business hours.

Require users to use file-level passwords on files that contain sensitive information.

- IDG News Service



To construct something this amazing, Nature's tools were wind and water.

Fortunately, you've got all these.

Tools for every type of professional developer.



With all respect to nature, today's development jobs can be monumentally demanding. In fact, delivery dates have accelerated to what seems an almost unnatural rate. Which is why we've created the Powersoft® family of comprehensive tools. To get things done. From C++ to Java to 4GL, you've got the power to make

PowerBuilder*

Fast applications, anywhere Power, precision and performance.

Optima++

RAD productivity meets the power and performance of C++. Fast client/ server and Internet solutions.

S-Designor®

Comprehensive modular toolset for DB modeling and object generation. Everything you need.

Watcom" C/C++

Robust C and C++ on a multitude of platforms. Performance nothing short of brilliant.

business applications perform.

Our products include such performance enhancers as ObjectCycle™ for version control, patented DataWindow™ for easy data access and Visual Components™ galleries that add incredible functionality. And Sybase* SQL Anywhere™ pro-

vides local database access to create, develop and deploy from wherever you choose. Questions or tips? Our support staff has answers for every type of developer. All so you can do some pretty amazing work yourself. As quickly and easily as humanly possible.

For more about our industry-leading development tools or to place an order, call 800-395-3525.

Or visit www.powersoft.com.

Managing

By Alan S. Horowitz

f you hope to rise to a leadership position but are afraid your introverted personality will thwart your ambitions, take heart. The good news, experts say, is that introverts can be effective leaders, too. Chances are you have strengths that can be the foundation of a strong leadership style.

And there are many ways to improve on any weaknesses that hold you back. The experts' message: Don't give up.

The fact is, introverts have a lot going for them

"The introvert is the most effective leader. He's quieter, more observant, more of a listener, longer in thought. To me, these are assets to leadership," says L. Paul Ouellette, CEO of Ouellette & Associates Consulting, Inc., an information systems human resources consultancy in Bedford, N.H.

Darwin A. John, the soft-spoken managing director of information and communications systems at the Church of Jesus Christ of Latter-day Saints in Salt Lake City, breaks down leadership into two qualities: the ability to create and

set a vision, and the ability to communicate that vision and mobilize people to carry it out. According to John, creating the vision is best done by introverts, who are thoughtful and able to visualize the future.

The second quality, which emphasizes communication, mobilization and building a sense of excitement, is where the extrovert has the edge, he says. The challenge that IS professionals often face, John adds, is "being able to see it but not being able to get it implemented."

Bart Bolton, a consultant in Upton, Mass., who facilitates leadership training forums for the Society of Information Management, says he likes the introvert's technical know-how. "A leader must have followers," he says. "If somebody has a high level of expertise, others will follow that person because of that expertise, not because [that person] can get up on a podium and give a speech."

Introverts tend to think things through and consider situations carefully, which is a strength. Extroverts, says Shandon Gubler, director of electronic products at the Covey Leadership Center in Provo, Utah, are so confident of their ability to persuade people that they often don't properly prepare and fully consider their ideas. "I would take a person who is well-prepared, that has introverted tendencies, over one who is falling back on their personality ethic," he says.

Introverts "are smart, and they come with that powerful analytical capacity," says Dick Dooley, a consultant in Riverwoods, Ill., and a former chief information officer at major banks.

Thoughtful, good at listening, careful, analytical, technically knowledgeable, smart, well-prepared — these traits of introverts can be valuable leadership assets to build upon.

What to do

You don't have to become an extrovert to be an effective leader, but you will need some of the extrovert's skills. And although they may not come naturally, there is no shortage of ways to develop and improve those skills, even if you can't get away to take a leadership training program.

Leadership requires interacting with people, which doesn't come naturally to

introverts. Harvey Shrednick, a selfdescribed introvert and ex-CIO who is director of research at the Center for Information Technology at Arizona State University in Tempe, recommends that introverts master needed leadership skills by doing them over and over again, much as they might do morning exercises.

"You've got to get out of your office and pepper your schedule with stuff where you're engaging people and proactively seeking out people," he says. The Myers-Briggs personality test (see story, page 75) pegged Shrednick as having a significant tendency toward introversion. "In order to combat that, I had to consciously push myself to break out of my inner self." he says.

If you tend to be an observer rather than a leader, force yourself to take the initiative. "We [in IS] have typically had the kind of people who go away and write code by themselves. The introvert [has] discomfort in being the initiator and being proactive," says Jeff Clancy, a self-described introvert who until recently was vice president of information services at Citizens Gas & Coke in

Leader within, page 78

Most IS professionals are introverts. Does that mean they can never be leaders? Not if they develop . . .

The leader



Retention attention

What's foremost on the minds of chief information officers these days? Calculating the value of information technology investments and aligning IT with the business, says Jim Kinney, president of the Society for Information Management (SIM).

But the Issue ClOs are talking about wherever Kinney goes is the recruiting and retaining of quality people.

"Turnover rates have increased for everyone I talk to," Kinney says. The combination of a hot job market, lear of downsizing and the erosion of corporate loyalty has CIOs going the extra mile to find good employees. At Kraft Foods in Northfield, Ill., where he's the CIO, Kinney is not only doubling the number of college Interns, but also offering signing bonuses to December graduates who will commit to Kraft several months before they graduate.

Kinney says SIM helps member companies retain top staff. through education and training programs such as its Learning Forum. Programs that expose his staff to "outside perspectives". provide them with a better feeling about Kraft. They say, "Here is a progressive company that is not inwardly looking," he says.

is a progressive company that is not inwardly looking, "he says. In the executive suites, the question CIOs are being asked is, "How do I put an economic model around IT investments?" IT isn't regarded as a mystery anymore, Kinney says. "There's a recognition finally by the [chief financial officers] and CEOs of companies that this IT business is no different from any other. There ought to be a clear [return on investment], there ought to be some advantage and productivity gains to our cost structure."

Kinney says the top tactical decisions CIOs are making involve

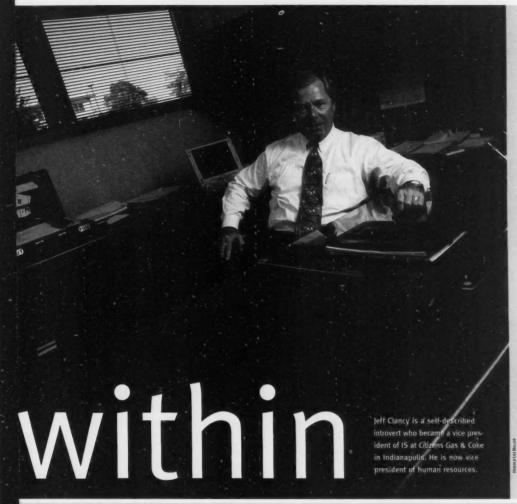
Kinney says the top tactical decisions CIOs are making involve the year 2000 issue and selecting the "server operating system, the desktop operating system and the internet browser."

- Allan E. Alter



FROM BACK SEAT TO DRIVER'S SEAT
Technology defines a business today because
it can help define new opportunities, columnist

Jim Champy writes. Page 78



What is an introvert?

The Myers-Briggs Type Indicator, a widely recognized evaluation tool, indicates that introverts share these traits:

- Are oriented toward their inner world
- Focus on ideas
- · Are reflective
- Consider things deeply before acting

This compares with extroverts, who tend to share these traits:

- Are oriented toward the outer world
- Focus on people and things
- · Are active
- Use trial and error with confidence

"The behavioral characteristics [of the introvert] tend to be along the lines of preferring to work in solitary, liking to get into things in depth, [doing] their best thinking alone and [wanting] to organize their thoughts before speaking."—Gerald P. Macdald, CEO of the Center for Applications of Psychological Type, Inc. in Gainesville, Fla.



From the mouths of users

Customers (or users, in the information systems vernacular) say the strangest things — and launch a lot of laughs saying them.

In their new paperback, Coaching Knock Your Socks Off Service (Amacom), Ron Zemke and Kristin Anderson offer customer-service supervisors and peers advice in honing their skills. They also offer comic relief, detailing some of the things cus-

tomers say, especially when it comes to computers.

From Rich Stimek
Grumman Data Systems, Long Island, N.Y.:

happened. Oh! Was I supposed to key it in?

CUSTOMER SERVICE REP: You'll have to make up a new password.
CUSTOMER: Okay. (Long pause.)
REP: Sir? What's happening?
CUSTOMER: I made upa new password and nothing

► From Dayle Smidt
Dialog information Systems
Palo Alto, Calif.:

CUSTOMER: What database do I search to get informa-

tion on the calcification of wombats' toes?

From The Wall Street Journal (March 1, 1994):

CUSTOMER: I've pushed and pushed on the foot pedal, and I can't get this computer started. CUSTOMER SERVICE REP: Foot pedal? CUSTOMER: Yeah, this white thing with the little ball on the bottom and the clicker at the top.

To our readers

We will no longer print a monthly listing of workshops for IS managers. But you can find the listing at our World Wide Web site, @Computerworld (www. computerworld.com).



















INTRODUCING DOMINO INTERACTIVE WEB SERVER. NOW YOU CAN MAKE SURE ONLY YOU-KNOW-WHO SEES YOU-KNOW-WHAT.

There's been a lot of talk about security on the Internet, But most of it has centered around keeping people locked out. Not enough about allowing people in. That just changed,

environment unlike websites created by Microsoft® or Netscape. With Domino your website becomes an interactive business tool that

Enter Domino™ The new Internet server technology that lets any web client use web applications securely.

Plainly stated. Domino gives you the flexibility to



POWERED BY control who sees what. It's not about putting a giant padlock on your data.

It's about giving out "keys" to those who need them.

And only to those who need them.

You see, Domino has a special access control feature that recognizes who each user is and what their roles are in or outside of your company. All of which is determined exclusively by you.

links your website activity to the appropriate departments and people within your company.

And once on site, visitors will experience a dynamic

And with Domino, the content owner can easily and securely update web pages in real time on-line without coding HTML. So your website visitors always see the most recent information.

Best of all, Domino is built on the world's most powerful and secure platform for business applications: Lotus Notes."

Doming from Lotus. We thought you should know. For more information, please visit our Lotus website at http://domino.lotus.com.

Jim Champy

Now batting cleanup: Information technology

In our era, technology defines what the business is because of its power to define new opportunities



Does it really matter how business leaders view information technology as long as they believe it's important? You bet. Especially to IT executives. Believing it's important hardly matters. What's required is rigorous thinking as to how it's important.

tant to the fate of the enterprise.

The Wall Street Journal recently ran a front-page story about the technology concerns of Hugh McColl, chairman and CEO of NationsBank Corp. and one of banking's true visionaries. The story described his anxiety: He knows technology will dramatically change the banking industry; he just isn't sure how.

"The thing is like a tidal wave," McColl says. "If you fail in the game, you're going to be dead."
Without knowing exactly what's over the horizon, McColl knows he must invest aggressively to invent and influence the future direction of banking. He understands the dire consequences of guessieus were aggressively to incompare the support of the suppo

The odds favor this former Marine because he has always stayed close to the front lines of the battlefield. But he is outnumbered, unfortunately, by a lot of blissfully ignorant CEOs for whom IT is only a cost to be contained, an aid to service instead of a transformer. This all-too-frequent situa-

tion helps explain why the best information systems executives I know — as a crucial part of their mandate — truly educate senior leaders.

Robert Capa, one of the greatest combat photographers of the century, once told one of his students: "If your pictures aren't good enough, you're not close enough." His acute insight carries over directly to my point: If the technology of a business isn't good enough, then it isn't close enough to defining what the business should be. It's playing a walk-on role instead of a leading role. And you and I know that if a CEO only superficially understands technology, technology's impact on the firm's overall competitive well-being will be correspondingly slight. Have you asked the post office to trace a lost package lately?

A business school professor argued with me recently that technology was only an enabler, that economic, political and social forces determine the strategy of a business and the shape of industries. Because this is America, business professors have the right to be not only wrong but also dead wrong. In our era, technology defines what the business is because of its power to define new opportunities. Look at Fred Smith and Federal Express Corp. Technology defined the industry he imagined. And where would retail banking be without automated teller machines? Also, airline reser vations systems have created a stand-alone industry.

To use a baseball analogy, why has IT gone

from being a good utility player to being a power hitter?

The answer lies principally in the advent of pervasive communications technologies; the Internet is the most dominant example. Those kinds of communications technologies can change the relationship between a business and its customers—finally delivering on technology's strategic promise. Almost every industry feels its effects: media, health care, banking and retailing. And businesses, such as digital book and music stores, food shopping services from home and virtual banks, are being created based on the technology. Often, those businesses involve a combination of producers whose businesses are converging around a new set of customer needs.

But how should business executives think about IT as they begin to invent the future?

Here are a few questions you might ask to help get them started:

- What is the product or service your customers really want (or will really want)? Can you create a business to provide those products or services using today's technologies?
- How will your industry be restructured because of IT — new combinations of producers, new products, new services?
- Will IT allow new competitors to enter your markets? What should you do about it?
- What capability does your company have to deal with those issues? Remember, dealing with IT as part of a business strategy is much different from dealing with it as a business function.
- How much time do you have to act? Recognize that your managerial "time clocks" were set in the industrial age, when business change took years, if not decades. Change then was deliberate; today it's sudden. The life span of the status quo is constantly shrinking.

IT has become a strategic necessity. Believe it, act on it or become a footnote in history.

Champy is chairman of consulting at Perot Systems Corp. in Cambridge, Mass. His newspaper columns are syndicated by Tribune Media Services.

Leader within

CONTINUED FROM PAGE 74

Indianapolis. He is now vice president of human resources.

Ouellette recommends another way to push yourself: When you leave town, turn over management responsibilities to your trusted assistant and tell him not to call you. Introverted leaders sometimes overmanage; this is a way to break that habit.

There are other habits to break. "You must be thinking not so much about the sophistication of your code as about yourself as a business manager," says Bob King, vice president of information services at United Healthcare Corp. in Hartford, Conn. 'Talk about things like, 'When this pro-

gram runs it has this kind of benefits.' Connect your effort to the business priorities or business benefits that your company has. That's not a habit most IS people follow."

Because introverts often have a hard time acknowledging their subordinates' efforts, Sherman Roberts, a program manager at the Cambridge Center for Behavioral Studies in Cambridge, Mass., recommends carrying 3-by 5-inch cards on which to record the names of people you compliment and whose performance improvement you reinforce and to note the frequency of such feedback.

Also, people who are uncomfortable with communications can sometimes generate inappropriate aggression. "The classic systems programmer is going to tell

Two out of three

Myers-Briggs Type Indicator research indicates that 67% of computer professionals are introverts [CW, May 1, 1995].

Of them, about a third fall into the category the Center for Applications of Psychological Type describes as "analytical, manager of facts and details, dependable, conservative, systematic, painstaking, decisive, stable," people who "are at their best when charged with organizing and maintaining data and material." Sound familiar?

you how dumb you are first before he tells you the solution to the problem because he has to demonstrate how smart he is," Dooley says.

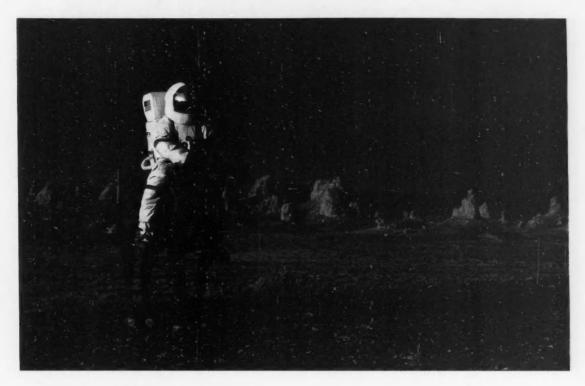
Gubler recommends that intro-

verts not hide their discomfort with public speaking, personal interaction and the like. "I would advise them to go public with their weakness right off the bat," he says. "If a person goes public, they've set themselves up to be helped."

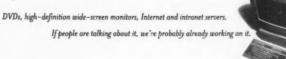
Perhaps the most important thing the introverted IS leader can do is acknowledge his short-comings and make a commitment to improve those skills. As Normand L. Frigon Sr., co-author of *The Leader* (Amacom, 1996, \$17.95), says, "If you are an introverted person, very computer-centric, the first thing you have to decide is, Yes, I want to be a leader. Therefore, there are certain things I know I must work on."

Acknowledging that — while building on your strengths as an introvert — makes the journey toward becoming a successful leader much shorter and faster. [®]

Horowitz is a freelance writer in Salt Lake City.



EVERYONE today is advertising the future. But do they have the tools to get you there?









Acer (>
A fresh perspective.

1-800-551-ACER www.acer.com/aac/

01996 Acer America Corporation. Acer and the Acer logo are registered trademarks and AcerPower is a trademark of Acer America Corporation and Acer Inc. The Intel Inside Logo and Pentium are registered trademarks of Intel



Notebooks

The new AcerNote™ Nuovo™ delivers up to seven hours of battery life from a single battery—hours longer than any other notebook PC! And since you'll be working longer, its ergonomically engineered keyboard raises and tilts for easier access and viewing.

In fact, everything about the Nuovo, from its 28.8KBps internal modem with fax and speakerphone to its expandable memory to its 6x CD-ROM module, is about making everything you do quicker and easier.

- •133MHz Intel® Pentium® Processor
- •11.3" SVGA Dual Scan or 11.8" Active Matrix Color Display
- •16MB EDO RAM (Expandable to 64MB)
- •Interchangeable 6x CD-ROM/ Floppy Disk Drive
- •Lithium Ion Battery with up to 7 Hours of Battery Life
- •2MB Video RAM Performance
- •16-Bit Sound Blaster® Compatible Audio with Built-In Stereo Speakers
- •3-Year Limited Warranty/1-Year Rapid Repair Service*

Servers

Need a server that's easy to set up and manage? Acer offers not one, but three. The entry-level AcerAltos™ 900; the AcerAltos 9000, for midsize company or departmental needs; plus the full-featured AcerAltos 19000, a scalable system designed to handle advanced operating systems.

Whichever you choose, you'll get a solid platform for Internet applications, as well as the kind of quality that results when one company designs, develops and manufactures its own systems.

- •CPUs from One 133MHz Intel Pentium Processor to Two Intel Pentium Pro Processors
- •ECC/EDO Memory
- •Up to 8 Expansion Slots (5 PCI, 2 EISA, 1 PCI/EISA), plus 14 3.5" Half-Height Drive Bays
- Acer StartUp Utilities on CD-ROM and Acer Server Manager Software
- Support for Microsoft Windows NT[™] Server, Novell[®] NetWare[™] SMP[®] and SCO[®] OpenServer[™]
- •3-Year Limited Warranty/On-Site Service

Desktops

There's no other poweruser system easier to tailor to a user's needs, or a tight budget, than the AcerPower[™] 5000 Series and 9000 Series PCs.

Available in either desktop or minitower models, each of these configurations is designed to run the most powerful business, graphics and multimedia applications. And thanks to its extensive expansion capabilities, the AcerPower can be tailored to something you might consider even more important: the future.

- •Intel Pentium 100MHz, 133MHz or 166MHz Processors
- •8/16/32MB EDO Memory up to 128/192MB, 256KB External Write-Back Pipeline Burst Cache
- •64-Bit PCI Local Bus Video
- •Stereo Plug-n-Play Sound Blaster Sound Card and 15W Speakers**
- Pre-Loaded Microsoft Windows 95, Windows NT or Windows for Workgroups
- •Software MPEG Support**
- •3-Year Limited Warranty/First-Year On-Site Service







1-800-551-ACER www.acer.com/aac/



© 1996. Acer America Corporation. Acer and the Acer logo are registered undernarks and AcerPower, AcerNote, Nuovo and AcerAltos are trademarks of Acer America Corporation and Acer Inc. The Intel Inside Logo and Proposition American Corporation. Microsoft, Windows, Windows NY and Windows Logo are registered trademarks of Microsoft Corporation. All other brands and product names are trademarks or registered trademarks of the Corporation and a reported in PC-VHH, July 1996. "See Limited Product Intelligence Companies," Independent crumo-country better transferred to their respective, companies, "Independent crumo-country better transferred to the Corporation and acer loc." PM-High 1996. "See Limited Product Intelligence Companies," Independent are respected in PC-VHH, July 1996. "See Limited Product Intelligence Companies," Independent and PC-VHH, July 1996. "See Limited Product Intelligence Companies," Independent and PC-VHH, July 1996. "See Limited Product Intelligence Companies," Independent and PC-VHH, July 1996. "See Limited Product Intelligence Companies," Independent and PC-VHH, July 1996. "See Limited Product Intelligence Companies," Independent and PC-VHH, July 1996. "See Limited Product Intelligence Companies," Independent and PC-VHH, July 1996. "See Limited Product Intelligence Companies," Independent and PC-VHH, July 1996. "See Limited Product Intelligence Companies," Independent and PC-VHH, July 1996. "See Limited Product Intelligence Companies," Independent and PC-VHH, July 1996. "See Limited Product Intelligence Companies," Independent and PC-VHH, July 1996. "See Limited Product Intelligence Companies," Independent and PC-VHH, July 1996. "See Limited Product Intelligence Companies," Independent and PC-VHH, July 1996. "See Limited Product Intelligence Companies," Independent and PC-VHH, July 1996. "See Limited Product Intelligence Companies," Independent and PC-VHH, July 1996. "See Limited Product Intelligence Companies," Independent and PC-VHH, July 1996. "See Limited Product Intelligence Companies,



Surf Sites

Practical Internet sites for IS managers

By Leslie Goff

FEATURED SITE:

National Performance Review Home Page www.npr.gov

Corporate information systems managers can think of this repository of research, tools and management guidelines as their personal business process re-engineering consultant.

Vice President Al Gore established The National Performance Review to provide a central source of information for

the Clinton administration's "reinventing government" initiative.

Reinventing Government

Transcrive to remedigite to Street Laboratory and a control of the Contr

The site is aimed at federal employees and contains some sections on workplace procedures that aren't universally applicable, as well as some bureaucratic language and blatant cheerleading. But two sections — "Initiatives" and "'How-To' Tools" — offer content that relates directly to the challenges that any business in the 1990s faces. If you're involved in reinventing IS or the corporation, you'll find plenty to guide you through any rough spots. "'How-To' Tools" has three sections. Click immediately on "Interagency Benchmarking and Best Practices Council" to access several step-by-step guides to benchmarking. Highlights include the following:

- The Best Practices/Innovative Practices Database contains a useful paper that explains how management can use computer networks to exchange and speed the adaptation of best practices among business units and departments.
- "Initiatives" addresses issues such as management leadership, employee empowerment and intradepartmental cooperation in business process re-engineering. This area promises an upcoming page dedicated to information technology initiatives.

WORTH A HIT ...





EuroPages www.europages.com

You can download European economic data at this site if you have an Adobe Systems, Inc. Acrobat reader. Get up to speed on the move toward a single currency, Europe's recovery from recession, policy, corporate strategies in the coming single market and key economic indicators across 21 industry segments.

If you don't have Adobe Acrobat, you can use the site to find manufacturers and service providers across the continent. If your European offices are complaining about their Internet service provider, find a new one here. If they need contract programmers on-site during a software rollout, find them here. If they need a new supplier of printer paper, find it here. The search engine lets you look for information by company name, product category or country.

Enterprise Reengineering Magazine www.reengineering.com

This no-frills online version of monthly magazine Enterprise Reengineering offers a sneak peek at some articles in the current issue and posts past issues. If you are planning a reengineering project, need facts or anecdotes for a presentation or are grappling with the results of a reengineering project, you'll find it relevant reading. But you may have to invest some time in the effort.

Although the articles are worthwhile, keyword searching would provide added value. As it is, you have to point-and-click your way through each issue to find articles that apply to your situation. Articles from past issues include an examination of the year 2000 problem (June) and tips on how to survive major changes in IS organizations (August).

Training and Seminar Locator www.tasl.com/tasl

Training and Seminar Locator, which bills itself as an education, training and development resource center for business and industry, delivers for surfers who seek training in any subject and medium. The all-text site loads quickly, and the search engine performs efficiently. It lets users search by subject for scheduled events, services available on demand, specific products or vendors.

Under services available on demand, a search for "information systems" yielded only three courses. But searches for specific products and scheduled events, using more generic subjects, returned broader selections. For example, "leadership" under scheduled events had 16 matches. And "teams" under specific products returned a few pages of videotape and multimedia titles.

All Business Network www.all-biz.com

This directory is a portal to a wide and diverse range of business resources on the Internet. Though not efficiently organized, the site is almost comprehensive. It covers nearly every area of business and provides job searches, business travel information and business services.

The links from the home page's Headline News, Reference Desk and Off the Shelf overlap a bit, but each has a different perspective.

The Job Bank page links to interviewing tips and other advice articles, recruiters, online resume posting services, training sites and virtual iob fairs.

The subject-oriented listings are of variable quality, but the Women@ Work section is one of the best.

Goff is a freelance writer in New York.

WHAT'S MORE
WATCHING YOUR
APPS RUN ON
OR WATCHING YOUR
FIGURE OUT HOW

GRATIFYING: BUSINESS-CRITICAL THE INTERNET, COMPETITORS TRY TO YOU'RE DOING IT?

Introducing WebSpeed. The first comprehensive environment for developing and deploying Internet Transaction Processing applications.

In the competitive arena of Internet one-upmanship, more IS managers than ever are walking around like the cat who ate the canary. Why? WebSpeed, from Progress Software. The first development environment specifically designed to harness the universal reach of the Internet and the power of database transaction.

processing. Enabling you to create "self-service" applications that put order-entry, claims processing, inventory status and other powerful capabilities in the hands of the most important decision-maker: your customer. Find out more by calling 1 888 274-7222

or visiting our website for a free evaluation guide. You sly devil, you.

Now-That's Progress

Can we get dynamic Intranet access?

Can users navigate quickly, intuitively?

Can without technology plans?

Can be provided as the construction of the construction



Hyperion Software offers the most "can do" financial management solutions—accounting, budgeting, reporting and analysis. Now, with the availability of our new **Spider-Man** Intranet application, users have dynamic, interactive access to all Hyperion solutions through standard web browsers and the Internet.

Providing intelligent access to reports and charts from Hyperion's product suite, our **Spider-Man** application makes it easy for users to navigate through, analyze and report against your critical information. And our new information access solution fully leverages our Common Data Access (CDA) technology.

Integration with other web sites is possible by incorporating other Internet applications directly with the **Spider-Man** application. In addition, hotlinks can be made to other web sites and you can write and include your own Java applets.

More than 2,700 companies are working and winning with Hyperion Software right now. A strong, proven record of financial applications expertise has earned us credibility and valued relationships with CFOs, Corporate Controllers, CIOs, and their staffs.

Can Hyperion Software really deliver this latest advancement in technology NOW?

YES! Contact us to find out how. And visit our site on the World Wide Web at http://www.hysoft.com.

1-800-286-8000

info@hysoft.com

Hyperion

Buyer's Guide

A review reveals that the Web server market is indeed maturing, and it's getting harder to tell the differences among the products from the client end. In the areas of ease of setup and design, it's small developer O'Reilly & Associates first, Microsoft second and Netscape third. By Ted Vegvari

PRODUCT REVIEW

FIRST IN AN OCCASIONAL SERIES OF REVIEWS OF WEB SERVERS. HERE WE LOOK AT:

O'Reilly's Website Professional 1.0,
Microsoft's Internet Information Server 2.0
and Netscape's Enterprise Server 2.0

t was an excellent deal. The prize was \$100 to anyone in our offices who could name which of the three Web server software products included in this review was running at the other end of the cable — either by a dial-up line or over our intranet. The losers had to give me \$5.

Three World Wide Web servers were set up side by side, and not one of more than 30 experienced users, mostly consultants and technicians, could tell the differences at the client end among the three products we tested. I ended up with a delicious meal.

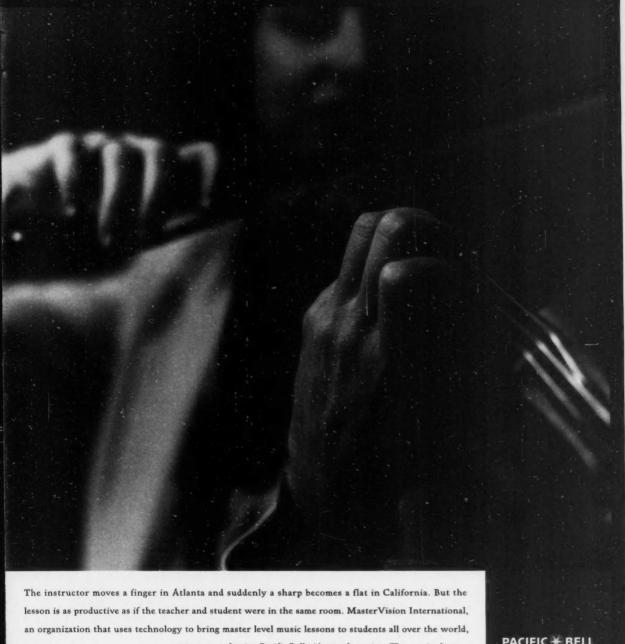
That remarkably simple, yet revealing, test validates what many information systems departments now realize: The Web server software market has matured to a point where buyers can be confident that they will get the same performance and core functions from multiple vendors. So if there are bottlenecks for users accessing your Web site, they're more likely to be on the network, rather than being the fault of the Web server software.

Users typically don't know to which Web server product they are connecting. Recognizing that fact does help an IS manager reduce the

"Name That Server," page 89

Sure you're in a different time zone. But that's no excuse for falling half a measure behind.





FasTrak Video Services

stays connected using Pacific Bell videoconferencing. The service lets an instructor give a performance in Cleveland, supervise a class in Atlanta,

all without leaving his studio in New Jersey. Pacific Bell FasTrak" Video Services is an ideal way for people and businesses to work together when they can't actually be together. It's easy to set up and is available just about anywhere in the world. To learn more about FasTrak Video Services, call 1-800-400-6594, ext. 21.

PACIFIC * BELL
N I T W O R K
How will you use it?





IN TODAY'S

ENTERPRISE

NETWORK



Exhibits: February 4-6, 1997 Conferences: February 3-6, 1997 Washington, D.C. Convention Center Renaissance Hotel • Grand Hyatt

For a complete brochure and to find out how you can pre-register now and save, call

800-545-EXPO

See ComNet on the WWW: http://www.mha.com/comnet/

ComNet's Exhibit Floor:

The Complete Picture of the Global Enterprise Network

The ComNet '97 exposition will feature more than 500 of the world's leading telecommunications and networking vendors, offering the latest in voice, data, and video communications, hardware, software, and services. It's an unequaled opportunity to explore hot new products and companies first-hand and get answers to your questions from the vendors themselves.

Get your hands on new tools and technologies at the beginning of the year. Test-drive the products you've been hearing about to see how they'll work in your organization. Meet the leaders and innovators of the latest enterprise networking advances. This is your chance to ask questions, get technical advice, and solve your toughest problems on the spot. Put the power of the ComNet exhibit floor to work for you!

ComNet's Conference Program:

A Non-Stop Learning Experience

ComNet's conference tracks will arm you with an invaluable fortress of insights, updates, and guidelines on enterprise network technologies and techniques. Plus you'll get a collection of tips, shortcuts, and cost-saving techniques never found in manuals that will save you time, optimize your network, and squeeze absolutely the most power and productivity out of today's technology (and your budget). You can create your own agenda from nine separate tracks:

- The New WAN
- · Fast LANs and Switching
- · Remote Access and Mobile Workers
- Network/Systems Management
- · Internet/Intranet Issues
- · Policy and Deregulation
- Federal Forums
- Technology Primers
- You-Asked-For-It!

PONSORED BY

COMMUNICATIONSWEEK

COMPUTERWORLD

washingtonpost.com

i am interesteu in.	Attenuing	2 Exhibiting	CPP
Name			
Company			
Address			
City/State/Zip			
Phone	Fax		
email			
Mail to: MHA Event Ma Highway, Norwood, MA	nagement, P.O. 02062 Or Fax 1	to: 617-440-0357	
THIS IS N	NOT A REGISTR	ATION FORM.	

Send more information on ComNet '97

COMPUTERWORLD

Everything you need to know.

Save over 73%

	trade C1
8	Yes, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of \$39.95* per year - a sayings of over 73% off the single copy price.

First Name	MI	Last Name	
Title	,	Company	
Address		City State	Zip
Address Shown: THome Business They	w 🗇 Renew Single copy price: \$3.00	Visaue *U.S. Only. Canada \$95, Mexico, Central/South A	America \$150, Europe \$295, all other countries \$
	Please co	emplete the questions below.	
BUSINEBS/INDLASTFY (Circle one) Menufacture (other than computer) Financipal Estate Hedical Lamifocación Hedical Lamifocación Hedical Lamifocación Wholesement Hestell Tracing (DP) Government - Statel Federal/Local Communications Systems Public	TITLE/FUNCTION (Circle one) ISRAIIS/DP MANAGEMENT To the Information Officer Vices President Asst. VP ISAMIS/DF Management To Dir Afgr. MIS Services, Inform Center	51. Sales & Mktg. Management 70. Medical, Legal, Accounting Mgt. OTHER PROFESSIONAL MANAGEMENT	How many people are employed at the location and in your entire organization, including all of the benefitine, devisions and subsidiaries. (Swiet) only one per column.) 1. All this 2. Entire location. Organi
Utilities/Transportation 70. Mining/Construction/Petroleum/ Refining/Agriculture	 Dir./Mgr. Network Sys., Duta/1 Comm., LAN Mgr. /PC Mgr., T Planning, Administrative Servi 	Educators, Journalists, Students	A. 20,000 + 7 7 8 10,000 -19,999 7 7
100. Menchacturer of Computers, Computer-Related Systems or Peripherals 85. Systems Integrations, VARs, Computer Service Bureaus, Software Planning & Consulting Services	 Dir/Mgr. Sys. Development, Systems Andreischure Programming Management, E Developers Engineering, Scientific, F&D, 	3. Dis you case, evaluatia, specify, recommend, purchaser. (Circle all that apply) Operating Systems (a) Estants (b) Nethware (i) Windows N (i) Windows N	C. 5,000 – 9,999
90. Computer/Peripheral Dealer/Dist./ Retailer	Tech. Management 80. Sys. Integrators/VARs/Consul CORPORATE MANAGEMENT	ting Mgt. (g) CIS/2 (g) Windows (h) NexThree App. Development Products (7) Visi (7) N	H. 20-49 J. 10-19 D. K. 1-9
95. Other	11. President, Owner/Partner,Gen	erel Mgr. Networking Products 3 Yes 3 N	

COMPUTERWORLD Everything you need to know.

Save over 73%

Yes, I want to receive my own copy of **COMPUTERWORLD** each week. I accept your offer of \$39.95* per year - a savings of over 73% off the single copy price.

First Name	MI		Last Name			
Title		Compa	ny			
Address Shown: ☐ Home ☐ Summers ☐ In	lew C Ramew 1	City Single copy price: \$3.00/iesue	State *U.S. Only. Carneda \$35, Mausico, Central/South A	Zip kmarka \$150, Europe \$295,	all other cour	ntries \$2
		Please compl	ete the questions below.			
BUSSHESSAMMUSTRY (Circle cire) Sile-utilischuse (other than skarijaulier) Financialischuse (other than skarijaulier) Financialischuse (other than skarijaulier) Medicalifuswickluselischu	19. Chie Pres Man 21. Dir./I Cent		12. Wice President, Aset. VP 13. Tressure; Controles; Flunciai Cilicie DERATMENTAL MANAGEMENT 51. Saliel 8, Mary, Management 70. Madical; Legal; Accounting Mg, OTHER PROFESSIONAL MANAGEMENT 60. Internation Commence; Uppers	 How many policie a location and in your including all oil its bi and subadianee? (5 per column.) 	antine organizanches, divisio	railion, one
Utilities/Transportation Till. Mining/Construction/Petroleum/ Refining/Agriculture	Com	Mir. Network Sys., Data/Tale. nm., LAN Mgr. /PC Mgr., Tech nning, Administrative Services	Educators, Journalists, Students 90. Other Titled Personnel	A. 20,000 + B. 10,000 -19,996	0	0
Manufacturer of Computers, Computer-Related Systems or Parioherals.	23. Dir./I Syst	Mgr. Sys. Development, tems Architecture gramming Management, Software	Do you use, evaluate, specify, recom- mend, purchase: (Circle all that apply) Operating Systems	C. 5,000 - 9 989 D. 1,000 - 4,999 E. 800 - 889	0.0	000
 Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services 	A1. Engi	relopers insering, Scientific, R&D, h. Management	(ii) Sciente (iii) Mindows N (b) Network (f) Windows N	F. 100 - 499 IT G. 50 - 99	0	0.00
90. Computer/Peripheral Dealer/Dist./ Retailer 95. Other	60. Sys.	n, Management Integrators/VARs/Consulting Mgi RATE MANAGEMENT	App. Development Products (1) Visc (1) N		2	000

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 55B MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P O BOX 2044 MARION OHIO 43306-4144 NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 55B MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P O BOX 2044 MARION OHIO 43306-4144 NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

"Name That Server"

CONTINUED FROM PAGE 85

variables when selecting Web server software. It allows the decision to be based primarily on ease of use, development and management tools, reliability and scalability.

Attractive product pricing by vendors has also significantly leveled the playing field.

The primary issues - ease of use and reliability - require hands-on evaluation.

However, the recent crop's comparative ease in setting up Web server software has shifted the responsibility of further simplification back onto the shoulders of the operating system. What is most confusing to many users is the host of technical terms that can

ufacturer's technical support staff. It's up to the manufacturer of prise Server virtually tied for second. the operating system and the Web server to simplify the process.

We tested three well-known Web server products designed to run in Windows and Intel Corp. hardware environments: facility in Palos Verdes, Calif.

m: NT Advanced Server 4.0

Web server hardware (primary): Compaq ProSignia XL 500 server, 48M bytes of RAM, 2G byte SCSI-2 hard disk.

internet connectivity: U.S. Robotics Corp. Allegra ISDN Network and software connected to 128K bit/sec. Integrated Services Digital Network (ISDN) dial-up line through Eartalink

Network server operating system: NT Advanced Server 4.0

twork server hardware: Compaq ProSignia XL 500, 64M es of RAM, 2G-byte SCSI-2 hard disk, Cogent Information ns, Inc. EM110 EMaster Fast Ethernet Peripheral Coment Interconnect (PCI) adapters.

Werkstations: Ten Compaq Deskpro XL 5100 PCs with 32M bytes of RAM, 1.26 bytes of disk storage, Windows NT West-station 4.0, Cogent EM110 EMaster Fast Ethernet PCI adapt-ers and U.S. Robotics 28.8V Everything analog moderns attached to analog telephone lines.

O'Reilly & Associates, Inc.'s Website Professional 1.0, Microsoft's Internet Information Server (IIS) 2.0 and Netscape Communications Corp.'s Enterprise Server 2.0. What we learned surprised us.

The giants, Microsoft and Netscape, were bested by a small developer in some key areas. O'Reilly's Website Professional wins for ease of setup and great design: Microsoft wins for administration, integration and management; Netscape wins for being the "standards model."

On single-processor Compaq Computer Corp. servers (see box at left), these products performed equally well. But in additional tests using dualprocessor machines, IIS proved to be more scalable and showed greater performance gains when taking advan-

stop the installation cold and require lengthy help from the man-

Vegvari is a principal at PC Lab, an independent testing and review

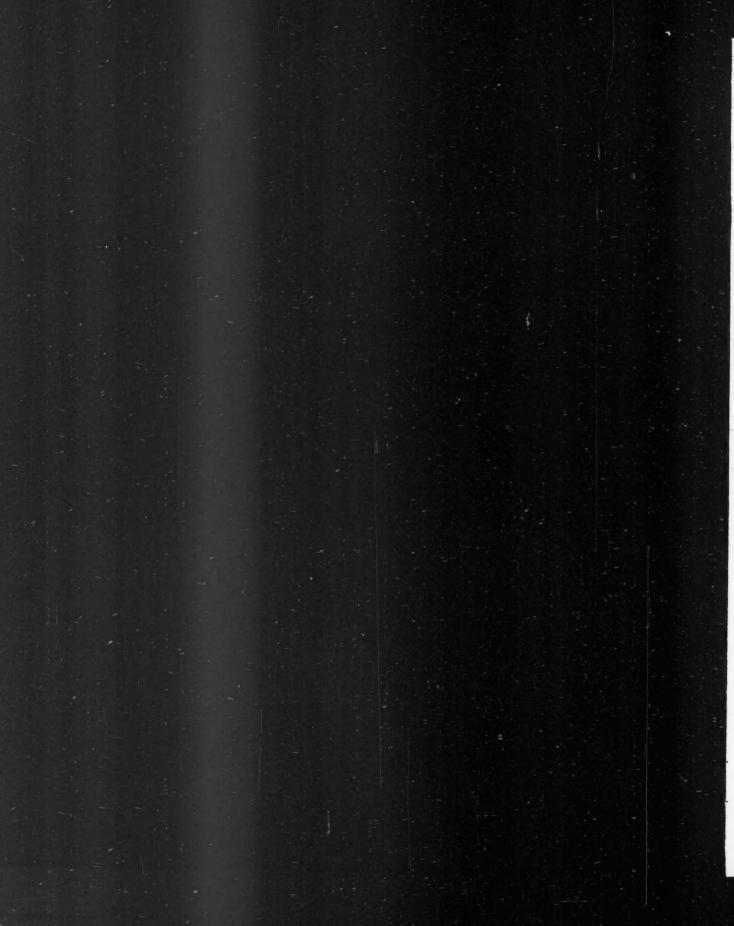
O'Reilly & Associates, Inc. Sebastopol, Calif. (707) 829-0515 www.software.ora.com

'reilly & Associates is one of the first vendors on the market with Web server software. Its Website Professional addresses the key requirements that are most commonly sought by Web administrations, whether they are just beginning or advanced: ease of use, clear documentation and reliability. We ran Website Professional on a production server for a month without failures or problems.

The first thing we noticed after opening the product box was that there was no shortage of well-written documentation. Online documentation is also available, but the manuals initially provide the start-up information. Although it's unlikely that the "Getting Started" guide will be needed, it clearly supports the installation procedure.

Website Professional, page 92





"Name That Server"

CONTINUED FROM PAGE 85

variables when selecting Web server software. It allows the decision to be based primarily on ease of use, development and management tools, reliability and scalability.

Attractive product pricing by vendors has also significantly leveled the playing field.

The primary issues - ease of use and reliability - require hands-on evaluation.

However, the recent crop's comparative ease in setting up Web server software has shifted the responsibility of further simplification back onto the shoulders of the operating system. What is most confusing to many users is the host of technical terms that can

ufacturer's technical support staff. It's up to the manufacturer of the operating system and the Web server to simplify the process.

We tested three well-known Web server products designed to run in Windows and Intel Corp. hardware environments:

Web server operating system: NT Advanced Server 4.0

Web server hardwave (primary): Compaq ProSignia XL 500 server, 48M bytes of RAM, 2G-byte SCSI-2 hard disk.

Internet connectivity: U.S. Robotics Corp. Allegra ISDN Network and software connected to 128K bit/sec. Integrated Services Digital Network (ISDN) dial-up line through Earthlink

Network surver operating system: NT Advanced Server 4.0

Network server hardware: Compaq ProSignia XL 500, 64M bytes of RAM, 2G-byte SCSI-2 hard disk, Cogent Information Systems, Inc. EM110 EMaster Fast Ethernet Peripheral Component interconnect (PCI) adapters.

Workstations: Ten Compaq Deskpro XL 5100 PCs with 32M bytes of RAM, 1.2G bytes of disk storage, Windows NT Workstation 4.0, Cogent EM110 EMaster Fast Ethernet PCI adapters and U.S. Robotics 28.8V Everything analog modems attached to analog telephone lines.

O'Reilly & Associates, Inc.'s Website Professional 1.0, Microsoft's Internet Information Server (IIS) 2.0 and Netscape Communications Corp.'s Enterprise Server 2.0. What we learned surprised us

The giants, Microsoft and Netscape, were bested by a small developer in some key areas. O'Reilly's Website Professional wins for ease of setup and great design; Microsoft wins for administration, integration and management; Netscape wins for being the "standards model."

On single-processor Compaq Computer Corp. servers (see box at left), these products performed equally well. But in additional tests using dualprocessor machines, IIS proved to be more scalable and showed greater performance gains when taking advan-

stop the installation cold and require lengthy help from the manprise Server virtually tied for second.

> Vegvari is a principal at PC Lab, an independent testing and review facility in Palos Verdes, Calif.

O'Reilly & Associates, Inc. Sebastopol, Calif. (707) 829-0515 www.software.ora.com

> 'reilly & Associates is one of the first vendors on the market with Web server software. Its Website Professional addresses the key requirements that are most commonly sought by Web administrations, whether they are just beginning or advanced: ease of use, clear

documentation and reliability. We ran Website Professional on a production server for a month without failures or problems.

The first thing we noticed after opening the product box was that there was no shortage of well-written documentation. Online documentation is also available, but the manuals initially provide the start-up information. Although it's unlikely that the "Getting Started" guide will be needed, it clearly supports the installation procedure.

Website Professional, page 92



SAS Institute. Software Data Warehouse for Successful - Alexander Decision Making.

FREE for a Limited Time...A CD ROM Preview of

The Top New **Data Warehousing** Software When 200,000 IS managers were asked to

As the only end-to-end solution for rapid data warehousing, SAS software

delivers everything you need to manage, organize, and exploit your business data. The tools you use to build a data warehouse are the same ones used to maintain it...run it...and change it. And what's more, everything's scalable. You can jump right into enterprise-wide information delivery applications...or start small and build on your success.

SAS software doesn't consume overhead for database features you don't need. And once you have data in the warehouse, you'll find everything you need for data query and reporting, OLAP/multi-dimensional analysis, data mining, database marketing, data visualization, and much more. It's never been easier to access your data... or to arrive at informed decisions by turning raw data into real information.

choose the top software for data warehousing,

their answer had a familiar ring:

SAS software from SAS Institute.



SAS Institute

Software for Successful Decision Making

Phone 919.677.8200 Fax 919.677.4444 In Canada 1.800.363.8397

You can also request your free CD ROM, and learn more about SAS seminars in your area, by visiting us on the World Wide Web at http://www.sas.com/

Website Professional

CONTINUED FROM PAGE 89

After establishing a connection to the Internet using Windows NT's dial-up connection, we assigned an IP address and Web site name using the server administrator utility and tested the connection from a remote dial-up account. The process was almost identical to establishing a dial-up connection to an Internet service provider using Point-to-Point Protocol. Website Professional simply required an IP address and domain name to establish the connection.

To use cryptographic security, users must obtain a public-key certificate. Website Professional comes with a certificate request manager that leads you through the process of creating a certificate request and generating the key pair, making it easy to obtain and manage certificates.

Various utility programs are bundled with Website Professional, including WebView, for graphical views of your Web site when designing or troubleshooting; WebIndex and WebFind, for full-text search and retrieval; Cold Fusion, a development tool for linking Web servers to back-end databases; Sausage Software's HotDog Hyptertext Mark-up Language (HTML) editor; Map This, for designing clickable image maps; Spyglass, Inc.'s Mosaic Web browser, and Website Professional resources, which alone make the product worth buying because they provide excellent reference materials and tutorials from beginning to advanced levels.

We created test Web pages that contained 45M bytes of images and text. We then used Netscape's Navigator 3.0 to repeatedly load the Web pages from 10 PCs connected over an intranet. We repeated the process using Microsoft's Explorer.

The average time to load was 14 minutes using both Netscape and Internet Explorer. We found that Website Professional's performance matched that of IIS and Enterorise Server.

The same comparative results were obtained during tests using 10 28.8K bit/sec. dial-up connections.

PROS: Website Professional is the easiest product of the three to set up and configure, and it has a

rich choice of available vertical applications. It has excellent features. The most valuable, in our opinion, include cryptographic security, Secure Sockets Layer (SSL) and Secure Hypertext Transport Protocol with multi-identity (multiple certificate); application programming interface-integrated support for the Perl Version 5 language and Common Gateway Interface-mode Perl; and a serverside Java software development kit, including a server-Java interface, Java 1.0.1 runtime.

CONS: Remote management is limited in that Website Professional must be installed on both the remote and local computer.

RECOMMENDATIONS: We would like to see an HTML interface for remote administration instead of requiring that the application be loaded on both the local and remote machine.

This is easily the best product for most Web installations. It's easy to install and performs well. It is excellent for publishing, online catalogs and secure credit-card transactions. It also keeps up with the products from the big boys.

Internet Information Server

Microsoft Corp. Redmond, Wash. (800) 426-9400 www.microsoft.com

nstallation is fast and easy to complete if your Windows NT operating system is configured properly. But it can be a problem, for example, if the domain name hasn't been set in the control panel/network/applet. Then the IIS will advise you of a problem, but it won't lead you through the process of making the necessary correction.

It's already confusing figuring out where to plug in IP addresses, domain name server names and other specifications. That entire process should be reduced to just a few simple entries, as is found in O'Reilly's Website Professional.

Troubleshooting after installing IIS can be very difficult. It's easier to uninstall and reinstall

After completing the installation and successfully testing the connection, we found IIS to be elegant and remarkably integrated with NT. Documentation is thorough. but you have to wade through too much information to find what you are looking for. It really needs more wizards.

We found NT's ability to easily set NT directoryand file-level access rights and allow specific users to update files especially useful and foresee many

Computer Service State Comments

Galileo WWW Running
Galileo Gopher Running
Galileo FTP Running

Ready 1 Server(s) 3 Service(s) Running

possibilities when considering Internet groupware and remote updates. That was much easier to set up using IIS than Enterprise Server or Website Professional.

For large NT shops with remote locations and administration requirements, that level of integration is invaluable, and it is soolish not to factor that in to the selection process. We highly recommend IIS over Enterprise Server in distributed corporate environments because of that, and we predict that when directory services for NT mature, its wide-area network administration facilities will begin to approach those of Banyan Systems, Inc.'s Vines.

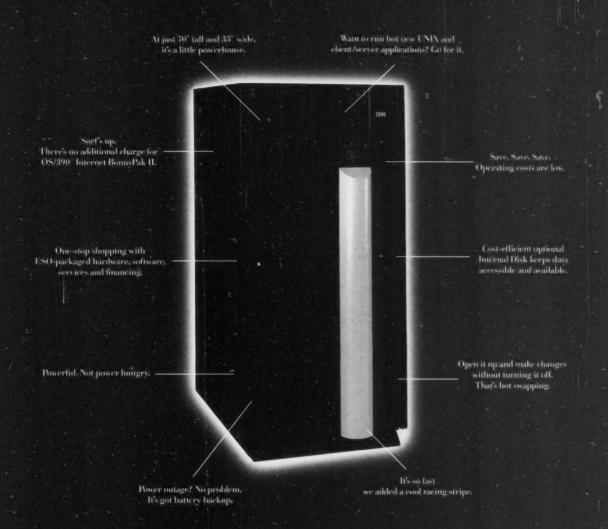
IIS supports SSL security, and we were able to easily generate a key pair, which is necessary to acquire an SSL certificate, through the new Key Manager application that is installed with the product and located in the Internet Server program group. However, that procedure requires that a lot of information be ready beforehand.

IIS lets users generate a key pair on another server as well as install certificates on remote servers. We successfully tested that rather complicated feature. Web and NT services and security are so seamlessly integrated that it's impossible to tell where IIS leaves off and NT begins. File transfer protocol and Gopher are also integrated in IIS but not in Website Professional.

PROS: Performance was excellent. Features, integration and management make this our choice for shops that require centralized administration and standardization.

CONS: Beyond the basic installation procedure, additional configuration is complicated and documentation is unclear.

RECOMMENDATIONS: IIS needs more wizards and a simpler installation process, with the ability to lead the user through error corrections in the NT setup and configuration.



Introducing the IBM S/390 Multiprise 2000. It's just as impressive for what it doesn't do.

The IBM S/390 Multiprise 2000° server looks like it does it all. But there are a few things it doesn't do. It doesn't take up much space, use lots of power or demand much time from your staff.

It also doesn't force you to buy loads of new software. The S/390 Multiprise server can handle just about whatever you're running now plus the latest UNIX, client/server and S/390 programs. Even corporatewide LAN data is a simple interface away. And Internet and intranet transitions are easy. So business can grow with the S/390 Multiprise family.

What's more, it doesn't consume all your resources. The S/390 Multiprise

saves up to 89% in floor space, 95% in energy costs and actually increases performance up to 40%

And it's all ready to go with our Entry Server Offering (ESO) packages. Which give you hardware, software, services, maintenance and financing at significant savings.

The new S/390 Multiprise 2000. If you want to be even more impressed, stop by and visit www.s390.ibm.com or give us a call at 1 800 IBM-2468, ext. CA254.

IBM

Solutions for a small planet"

^{*}As compared to the BM 3000 class processor Savings may very depending on carefuserable and S1,900 are registered randomarks and Mantinger 8000, the S1 are registered fractionarks and Mantinger 8000, the S1 are registered fractionarks or mantinger 8000 process with the United States and other countries increased exclusively through 50,000 processor braining to the S000 process with the United States and other countries increased exclusively through 50,000 processor braining thr



Computerworld Editorial Calendar

January - June, 1997

Issue Dates	Ad Closings Color® B&W		Editorial Features	Show Distribution & Ad Readership Study Issues	
Jan.	Dec.	Dec.	Annual Forecast Issue Annual IS Jobs Forecast		
Jan.	Dec. 20	Dec. 27	Closer Look: Melding the browser into the desktop		
Jan. 13	Dec. 27	Jan.	Buyer's Guide: Web commerce servers		
Jan. 20	Jan.	Jan. 10	Closer Look: HTML development tools Managing: Project management •IS Leadership Series		
Jan. 27	Jan. 10	Jan. 17	Buyer's Guide: Network management suites Intranet Monthly		
Feb.	Jan. 17	Jan. 24	Customer Satisfaction Quarterly: Managers rate their networking vendors •Computerworld Financial Services Journal, •Computerworld Retail Journal	ComNet: Washington D.C. 2/3 - 2/6	Starch Study
Feb. 10	Jan. 24	Jan. 31	Special Feature (Managing, In Depth, Guide): Computer Security Closer Look: Risk management systems in the financial sector		
Feb. 17	Jan. 31	Feb.	Buyer's Guide: Unix RAID devices *IS Leadership Series *Computerworld Healthcare Journal, *Computerworld Telecom Journal		
Feb. 24	Feb.	Feb. 14	Buyer's Guide: PC-based videoconferencing systems •Annual Premier 100 magazine •Intranet Monthly		
March 3	Feb. 14	Feb. 21	Closer Look: Web usage tracking tools •100 Hot Emerging Companies magazine	-	
March 10	Feb. 21	Feb. 28	Buyer's Guide: Massively parallel servers •Global Innovators quarterly supplement		
March 17	Feb. 28	March 7	Closer Look: Web-oriented peripherals •IS Leadership Series		
March 24	March 7	March 14	Buyer's Guide: Enterprise application development tools •Intranet Monthly		
March	March 14	March 21	Careers: IS staff training survey – the companies that do it best Closer Look: The scalability of data warehouse products		

Display Advertising

Black-and-White Display Ads: Friday (5 pm EDT or EST) 10 calendar days prior to issue date.

Color, Inserts, Premium Positions, and Special Feature Sections: Friday (5 pm EDT or EST) 17 calendar days prior to issue date.

Marketplace Advertising

Closing date for Marketplace advertising in each weekly issue is Monday (5 pm EDT or EST) prior to each following Monday issue.

Recruitment Advertising

Closing date for recruitment advertising in each weekly issue is Thursday (3 pm EDT or EST) prior to each Monday issue.

Industry Journals

Closing dates for advertising in Computerworld Industry Journals are different from those of the weekly Computerworld issues. Please consult your Computerworld sales representative for more information.

Issue Ad Closings Dates Color* B&W			Editorial Features	Show Distribution & Ad Readership Study Issues	
April 7	March 21	March 28	Buyer's Guide: Components and browser plug-ins •Computerworld Financial Services Journal, •Computerworld Retail Journal •Campus II magazine (actual issue date TBA)		
April 14	March 28	April 4	Managing: Technology for customer intimacy Closer Look: Intel workstations vs. UNIX		
April 21	April 4	April 11	Customer Satisfaction Quarterly: Managers rate their software vendors •IS Leadership Series •Computerworld Healthcare Journal, •Computerworld Telecom Journal		
April 28	April 11	April 18	Closer Look: Sonet update Intranet Monthly		
May 5	April 18	April 25	Buyer's Guide: Remote Access Servers Managing: Year 2000	Networld + Interop: Las Vegas, 5/5 - 5/9	Starch Study
May 12	April 25	May 2	Special Feature (Managing, In Depth, Guide): Object technology in the corporation		
May 19	May 2	May 9	Buyer's Guide: Enterprise DBMS •IS Leadership Series		
May 26	May 9	May 16	Careers: Annual Job Satisfaction Survey Closer Look: Beyond Visual GLS Intranet Monthly		
June 2	мау 16	May 23	Buyer's Guide: Web development packages •Best Places to Work magazine •Computerworld Financial Services Journal, •Computerworld Retail Journal	Comdex Spring/ Windows World: Atlanta, 6/2 - 6/5	
June 9	May 23	May 30	Managing: Reskilling the IS organization Closer Look: RMON – Product comparison and who's using it Global Innovators quarterly supplement		
June 16	May 30	June 6	Buyer's Guide: Pentium Pro Servers •IS Leadership Series •Computerworld Healthcare Journal, •Computerworld Telecom Journal	PC Expo: New York 6/17 - 6/19	Starch Study
June 23	June 6	June 13	Closer Look: Internet Email Software •Intranet Monthly		
June 30	June 13	June 20	Buyer's Guide: PDAs		

Editorial Contacts (508) 879-0700: Annual Forecast Issue – Steve Ulfelder; Closer Look – Kevin Fogarty; Buyers Guide – James Connolly; Managing, Leadership Series – Allan Alter; Electronic Commerce Journal, Premier 100, Industry Journals – Alan Alper; Campus Edition, Best Places to Work – Joyce Chutchian; Intranet Series – Ann McCrory

^{*} Includes ads within special editorial features and premium positions.

Enterprise Server 2.0

Netscape Communications Corp. Mountain View, Calif. (415) 937-2555 www.netscape.com

> Interprise Server installation is initiated by running entrprse.exe. During installation, a setup wizard leads you through the process and provides a choice of which directory to use prior to copying program files, which is similar to Netscape's Navigator.

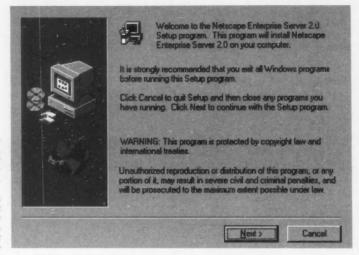
Netscape has maintained a consistent look and feel for its suite of products. Navigating becomes intuitive after you become comfortable using a browser as the interface for configuration and management. But it does take some getting used to — it doesn't look like Windows. It is extremely helpful, however, especially considering how frequently updates and new versions of mission-critical products are released.

Internet software is Netscape's bread and butter, and it shows. Administration is performed primarily through configuration screens using Navigator. That provides continuity, which translates to m reduced learning curve. But we feel that Enterprise Server doesn't have the depth of integration with NT that IIS commanded nor the ease of use that Website Professional demonstrated.

Enterprise Server was the only one of the three programs that crashed several times while running the server administration software, which really surprised us.

During installation, Enterprise Server advised that selecting a domain name would preclude other computers on the intranet from locating this Web server unless Dynamic Host Configuration Protocol was used. Again, we felt that having the option to use wizards at times such as that would help most users tremendously.

Enterprise Server consists of two servers: the Web Server, the main server; and the Administration Server, which is used to start, stop and configure the main server. Prior to writing the configuration files, we were advised to make changes to



our TCP/IP configuration for optimization, which IIS and Website Professional didn't recommend or require

Again, a portion of the installation was confusing. The examples used to describe how to select a name for the server shows two conflicting naming options.

The trade-off in using a Web browser to perform all administrative and configuration functions is that remote management is excellent, but using Web pages instead of "programs" isn't as efficient. Programs can be designed with much more functionality than a Web page.

We especially liked Enterprise Server's ability to provide a staging server, on which we placed work in progress, later moving it to the production directory. That is an extremely valuable feature and reduces the potential for accidental changes to production data, which happens frequently in Web shops. IIS and Website Professional don't offer that capability.

The integrated full-text search capability will meet most users needs and integrates the Verity Topic full-text search engine. But the shiniest gem buried in this product is integrated version control. That allows all content managed by Enter-

prise Server 2.0 to be automatically subject to version control. Each time a document is updated, a new version is created, and all old versions are accessible instantly. That's useful for keeping track of which webmaster updated which Web pages and when

PROS: Enterprise Server covers all the bases. High-volume Web publishing shops with 10 or more full-time Web content developers and administrators accustomed to minicomputers and Unix environments will find a complete solution that is thought-out and well-designed from top to bottom.

coms: Admin program crashed several times on two different machines. This product was clearly designed to provide a cross-platform solution. Its roots are still wet from being transplanted from Unix, and it doesn't "feel" like an NT product. The learning curve is significantly higher than Website Professional and IIS.

RECOMMENDATIONS: Netscape needs to decide which market it really wants — Unix or NT — and then design the interface for users of those platforms or develop two styles for two markets.

Glossary

Common Gateway Interface

A standard for external gateway programs to interface with servers, such as Hypertext Transport Protocol servers.

Domain name system

An electronic-mail addressing system that converts an E-mail address into an Internet address for transmission.

Dynamic Host Configuration Protocol

A standard protocol that assigns Internet Protocol (IP) configurations to com-

File transfer protocol

A set of TCP/IP commands used to log on to a network, list directories and copy files.

Firewall

A network node set up as a boundary to prevent traffic from crossing segments.

er- Hypertext Markus Language

A standard for defining links between documents in an Internet-based environment.

Internet service providers

Public providers of remote connections to the internet.

Press

A software program that connects a user to a remote destination through an in-

termediary gateway

Secure Seckets Layer

A protocol that supplies secure data communication through data encryption and decryption.

Subnet mask

A TCP/IP configuration parameter that extracts network and host configuration from an IP address.

"We found a fast, simple way to put inventory planning, customer service, and order entry on the web.

You didn't hear it from me."



"Just for the sake of argument, let's say there was a time we used spreadsheets for inventory planning, a database for customer records, and a one-off application for order entry. And let's say I figured out how to tie all those applications together into one program. Which just happens to run on the web. Well, there's a hot new

> product that lets you do all that, but I'm afraid you're not going to hear the details from me."

VisualWave.

The first integrated solution. It's true. Now there's one program that gives you everything you need to develop

client/server/web applications. Including database access, a web delivery system,

and an Internet Application Server.

You can build once and deploy everywhere. VisualWave runs on the 12 most popular client/server operating systems, as well as industry-leading browsers.

So what's the big secret? If you found a more strategic way to run your business, the fastest way to respond to change, and an integrated client/server/web solution.





would you want to tell your competition about it?



Maybe not.

It looks like some of our best customers don't want to give their secret away, either. So if you want to see exactly what VisualWave can do, call us at 1-800-759-PARC Ext. 402. Or visit www.parcplace.com.

VisualWave Official secret weapon of the Global 1000.

client/server/web applications

Java and ActiveX

development and deployment

www.parcplace.com gets you a white paper on VisualWave

In Depth

Online this week COMPUTERWORLD

If you long for the ergonaut's life, check out www.computerworld.com for a huge payload of ergonomics links, sites and information.

ERGONAUT

ONE 'NAUT TESTS SOME OFFICE COMFORT PRODUCTS

By Joseph Maglitta

on care. The others hissed, "Ergonomics? Not my job." You know better. How many wrenched necks, how many burning eyes, how many totured knockles must be endured before they see? What good is a three-tier, transaction-ready, enterprisewide intranet when the people — worr people, your colleagues and friends — dare not approach the keyboard or gaze upon the monitor because of the pain, the wretched, needless pain?

You know that carpal tunnel syndrome steals an average of 36 work days each year from those it laughingly calls victims. You can avert that pain — and save the company money. In your gut, you know that putting computers on someone's desk means you have a responsibility.

Let the others wait for human resources or facilities or that poor overworked administrative assistant to worry about ergonomics. At the end of the day, your breast, not your wrist, swells with pride. You are an ergonant.

RING PEN Not all ergonomic devices need be high-tech. Hide this beautifully sculpted 57-95 sing pen from your fellow warriors and infidels. Fine Designs, (770) 534-1386. SKALPI

Who needs a pricey company massesuse? Here's Skalpi, a three-speed portable head massager. (Warning: Close your eyes or you'll need Dramamine.) Are we not Ergonauts? Wisco, (828) 980-6330.

WRIST GAUNTLET

Like any good armor, these Velcro gauntiets feel a bit ... insect-like. A small price to pay for blunting the arrows of carpal tunnel syndrome, right Galahad? Smith & Nephew Roylan, Inc., (800) 558-8633.

WRIST REST
They look and feel like small intestines
sheathed in felt, but
this is more than just
ordinary guts-in-a-bag.
A decent wrist rest, the
Gel-eez GL1 shines
when folded in half as a
mouse rest. Case Logic,
(303) 530-3800.

SUSPENDERS

Power braces for the 'yos. Striking, nononsense style and exceptional lumbar support. Whether you're hunting the halls for business synergies, uncrating the latest technology or firing off hot electronic mail from your ergo-chair, you'll appraciate this lightweight gut-tautener. Chase Ergonomics, Inc., 800) 621-5436.

GLARE SHIELD At \$49, it ain't cheap. But you'll spend that on

Visine in six months if you don't have this most excellent glare shield. The best offense is a good defense, eh? Fellowes Computerware, (800) 945-4545.

Photography by Jack Foley



MOUSE COVERS

These jolly jelly mouse condoms look like plastic trilobites. At the very least, they'll keep your input di vice clean. The 1's worth something, isn't it? Van Oren. (800) 901-9041.



BUTT CUP

This in chair support device premises to help "merent and relieve" bark pain by encouraging good posture. It didn't cup my deluxe but quite right, but then I didn't watch the enclosed vides either. Backloy, (800) 666-6505.

VIRTUAL REALITY GLASSES

Your computer monitor should be wherever you look, right? Ask for the brand-new update of these three-dimensional specs. Is he working or watching TV? Not as sharp as a Sony Corp. Trinitron, but a heck of a lot more fun. Virtual IO, (800) 646-3759.

BACK PAD

Like a soft, nagging mom who reminds you to sit up straight. My own natural surplus of padding made it a bit tight for me. Chase Ergonomics, Inc., (800) 621-5436.

CHAIR

A chair's a chair, right? No way. This one's comfortable and not too pricey. Save your chief financial officer headaches. Girsberger Industries, (919) 934-0545.

RING MOUSE

Point-and-click infrared Ring Mouse. Not much easier than the ordinary kind, but it makes you feel very powerful. Kantek, Inc., (800) 536-3212.

ARMRESTS

Like Tang, these zero-gravity armrests seem inspired by the space program. The floaty feeling kinda grows on you. Ergonomic Logic, Inc., (800) 527-6600.

GLOVES

Hand Speedos. More comfortable than you'd think. Thera-Glove eases existing pain, many testimonials say. Downside: You have to take them off to eat snacks. One colleague found them "kinky." Ooooh. American Orthopedic Appliance Group, (914) 534-9087.

JOYSTICK

Let's all demand that more business software applications support easy-on-thehands joysticks such as the F-16 Combatstick, shall we? "Let me blast those numbers once more for you, Mr. Dorkle." C H Products, (619) 598-2518.

EIGHT BALL

Easy interface and sleek design make this the ultimate decision-support system. At mall novelty stores everywhere.

TABLE

Cheap, sturdy, comfortable enough, rolls anywhere. The VW Bug of the Temporary Office Age. Anthro Co., (800) 325-3841.

FOOT PEDALS

Toe-tappers will dig a chance to put all that nervous energy to work.
Wear out shoes, not hands. Bilbo Innovations, Inc., (408) 736-6086.

Maglitta is a former Computerworld senior editor, corporate strategies.



MOUSEMITT

Yet another way to gird your wrists for daily keyboard combat. Padded bottom section fends off desktop edges, And here's a bonus: If an in-line roller derby breaks out, you'll be ready for that, too! MouseMitt International, (800) 489-6488.

(www.amputerworld.com) OCTOBER 28, 1996 COMPUTERWORLD

IT's all about your business.



COMDEX/Fall is the world's biggest IT show — a one-of-a-kind event that puts every aspect of the IT universe in focus...and in context. From the desktop to the server to the Internet, you'll find your customized applications among 2,200+ exhibitors; 10,000+ new products, systems, and services; and over 70 conference sessions. Visit focused technology areas for communications and networking, ISDN, mobile and wireless computing, the Internet, multimedia. Windows NT, Microsoft BackOffice. Windows® 95, and more. Hear keynotes from major visionaries including Intel CEO Andrew Grove. Plus, take part in SuperSessions and PowerPanels!

3 ways to RECISTER and get more information.



COMDEX Online. Go to the hottest site on the Web to register for the exhibits and conference, or for complete information — www.comdex.com.



Call. Call the CONFERENCE HOTLINE at (617) 433-1650 to register for the conference or to find out more about sessions and speakers.



Fax. To register by fax call (617) 449-5554, enter code 25, and have your fax number ready — we'll fax your registration form within 24 hours.

©1996 SOFTBANK COMDEX Inc. • 200 f j is Avenue. Needham, MA 02194-2722 USA • 1817) 433-1500
Windows and Windows NT are represent trademarks and Microsoft BackOffice is a Hallemark at Microsoft Corporation.

Fall '96

NOVEMBER 18 - 22, 1996 · LAS VEGAS, NEVADA USA

www.comdex.com

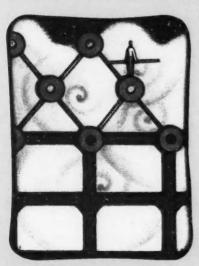
Volume 1 . Number 5 . October 28, 1996

. COMPUTERWORLD Intranets

INFRASTRUCTURE

FIRM FOUNDATIONS

THE MANAGER'S GUIDE TO WHAT'S REALLY IMPORTANT



Sure, you can cheaply build an intranet atop your current infrastructure. But soft costs add up fast. Piggybacking intranet expenses onto existing projects can provide solid grounding.

BY MICHAEL FITZGERALD

Call it the "infranet." It's the corporate infrastructure that underlies your intranets. Building it means far more than installing TCP/IP and a new server or two.

"You really can very cheaply and with very little infrastructure throw [together] an intranet," acknowledges Chris Lambert, an Internet/ intranet consultant for Broadway & Seymour, Inc. in Charlotte, N.C. "The question is, how valuable is it?"

Most companies naturally have some of the pieces in place. So piggybacking an intranet on current or WHAT'S ONLINE Page 3

ADVICE Page 4

PROJECT Page 6

Continues on page 2

ANALYSIS



Continued from page 1

planned systems is a sound fiscal start. It's long-term maintenance and growth you have to plan for.

An infranet comprises both equipment and people, to support the users and develop interfaces and apps. Having a handle on both might determine whether your project succeeds or fails

From the ground up

Beyond TCP/IP and user desktop systems, intranet managers say, a solid infrastructure includes:

- · Bandwidth: the ability to handle increased network traffic
- · Support for users and the content they manage.
- · Well-designed user interfaces and applications.

A solid yet flexible foundation is key because requirements change, says Rick Brennan, who directs Internet development at Sun Microsystems, Inc. Getting a free (or cheap) ride on another budgeted project is a common strategy for getting off the ground.

That's the method The Sharper Image used, says Vince Barriero, senior vice president and CIO. The San Francisco specialty retailer had long wanted to give store managers realtime access to corporate databases to speed ordering, cut inventory and boost customer satisfaction. Salespeople placed orders through a voice response

system or uploaded them after hours for processing the next day.

Unfortunately, Barriero says, store transaction volume wasn't sufficient to cover the hardware and telecommunications costs needed to put in a dedicated server connected to the corporate database. "We could never cost-justify it," he says.

But by piggybacking it on a store systems upgrade project, Barriero got an intranet essentially for nothing. The upgrade cost \$4,500 to \$5,000 per store for new hardware and \$100,000 total for software development, hardware deployment and telecommunications at the main corporate site. But the intranet was included essentially for free, Barriero says.

The Texas State Comptroller's Office is converting its SNA environment to TCP/IP and rolling out intranet applications as it goes, says systems analyst Ralph Hutchins.

The \$50,000 price tag for the intranet pilot - including a dedicated new RS/6000, the software suite and con-

WHAT ABOUT SYSTEMS MANAGEMENT?

Entergy Services Co. has about 1,000 intranet users and no bandwidth issues so far. United Parcel Service has 4,000 intranet users and reports no slowdowns either. But neither company is using any systems management tools. So is a clogged — or crashed — intranet just a matter of time?

Perhaps it's systems management that's a matter of time.

Before you can use systems manage ment tools, they have to be available. And before you can manage a system, a structure for doing so has to exist. As the often ad-hoc nature of early intranets matures, administration should follow.

"There is no [intranet] systems management being done so far," says Earl Perkins, man network projects at Entergy in Gretna, La. "It'll continue to be done in ad-hoc fashion until you treat these applications like an application, and you draw it under the systems management umbrella.

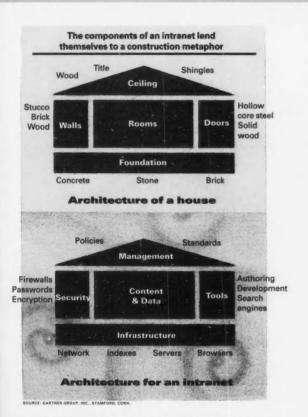
"A lot of people are living in a world of rudimen-tary system observation," says Michael Sullivan-Trainor, director of electronic commerce programs at International Data Corp. in Framingham, Mass. Most companies throw together an intranst with some HTML and CGI access code, he says, and "hope the whole thing doesn't

Sullivan-Trainor says software packages and services to handle intranet sitemonitoring are becoming more availmonitoring are becoming more available. Web products from vendors such as Netscape, Net.Genesis, Secure Computing (WebTracker), and Microsystems Software (CyberSentry) are in this group. Traditional traffic management tools — CA Unicenter or HP OpenView, for instance

- can be called into service as well.

Savvy intranet managers will pay attention — or pay the price of crashes and unreliable internal

- Michael Fitzgerald



sulting and programming costs — was largely absorbed into the budgeted migration project, Hutchins says.

At United Parcel Service of America, Inc., a huge intranet expansion will whitch a ride" on a project to upgrade various router links to bandwidths as high as T1 speeds, says Joseph Lawless, project manager of Internet systems at UPS.

And much of the foundation for providing intranet access to 80,000 users, vs. the 4,000 now, by early next year is already there. UPS already has IP stacks on desktops running Windows 95 and Windows NT as well as on Novell, Inc. NetWare servers.

Lawless does predict usage costs will rise as more key corporate information

goes online. "More and more people expect the data to be up," he says.

Bandwidth issues

On the networking end, surprisingly, one observer says intranet traffic needn't clog the pipes.

"For a company that's well-automated,[an intranet] will consolidate a lot of traffic," says Broadway & Seymour's Lambert.

But things can still back up on the server end. Many companies start intranets with low-budget, low-end servers, which choke when the companies post "fat" documents like human

Continued on page 4



 For profiles of the users in our analysis story, see our site at http://www.

computerworld.com/

intranets.

ALSO ONLINE THIS MONTH:

Forum with Web consultant
 Michael Sullivan-

Trainor of IDC



- QuickPoll: Intranet funding.Tell us: What do they really cost?
- Expanded interview with Chrysler CIO Susan Unger
- Unger's Top 10 Reasons to Create an Intranet
- Link into Chrysler's public relations site
- Shows and conferences
- Link to past issues
- E-mail us

intranets

EDITOR

Joseph Maglitta

MANAGING EDITOR

Anne McCrory

ART DIRECTOR

Janell Genovese

EDITOR, COMPUTERWORLD MAGAZINES

Alan Alper

Phone: (800) 343-6474 E-mail: alan_alper@cw.com Fax: (508) 875-8931

INFRASTRUCTURE

Continued from page 3

resources materials. Ironically, that can make it harder for employees to get documents online than off-line.

Plus, switching to TCP/IP can clog host processors. "We've noticed an increased load," says Texas systems analyst Hutchins.

TCP/IP makes the department's IBM mainframe a heavily trafficked network host, which sucks up processor cycles and runs less efficiently than under SNA. Plus, Hutchins says that because of the extra hits, the department needs to spend \$20,000 for a second 3172 front-end communications controller.

UPS isn't taking any chances. It's expanding bandwidth to avoid future traffic jams, says project manager Lawless.

And to maximize uptime, it expects to offer full redundancy for its Web servers. It may even mirror the entire site, including support services, the domain name server (DNS) and the proxy server - 15 servers in all. "We need to determine what's crucial and what's nice-to-have." Lawless says.

Reliability is an issue at Hibernia National Bank in New Orleans, too. Its Vision 2000 project is part of a threetiered client/server project. Asks Thad Hymel, the project's chief technologist: "How redundant is redundancy? Regionally? To the branches? We're beating our heads against the solution."

The bank will likely build in redundancy at the branch level, using Novell's NetWare IP 2, he says.

Resources

Support issues

If hardware and even networking can sometimes be practically freebies, here's the hidden cost: support.

"A lot of people need help configuring a browser," notes UPS' Lawless.

UPS employs 20 people to support the company's intranets and a World Wide Web page that sometimes logs 350,000 hits a day.

Indeed, people resources are tapped from the get-go. Building an intranet means "everybody has to get involved: PC people, network people, etc., and a lot of that falls under ongoing support and maintenance," says Texas' Hutchins.

The development end can't be shortchanged, either. Developing a universal interface for intranet pages is arguably the most crucial intranet task: A large corporation could waste \$1 million or more a year trying to locate material in departmental Web sites, says Jakob Nielsen, a human interface engineer at Sun Microsystems, Inc. Yet many companies skimp on interface design when planning the system.

"There's a physical infrastructure and an information infrastructure," Nielsen notes. He's just updated Sun's intranet interface, whose design had been overwhelmed since it was created two years ago. "We're trying to reimpose structure," he explains.

That's what an infranct is. It ain't an intranet for long without one.

> - Fitzgerald is Computerworld's former online editor.

Resources

CONFERENCES

The Business Online Conference: An Executive Guide to Internet and Intranet Strategy, San Diego, Calif. Dec. 3-4. Features see one in action. The home page offers more than 20 sessions. Sponsors: Meta Group, DCI, Information/registration: (508) 470-3880, or E-mail ConfRey@ dciexpo.com.

Resources

Still skeptical how your company could use an intranet? Visit Acme Fruit & Nut's site and company news and links to business units. Some functions are interactive, Includes a list of the software used in building it, too. http://foghorn.acmedia.com/

Resources

BOOKS: NEW TITLES

"Intranet Working" by George Eckel (New Riders Publishing, \$35). "Running a Perfect Intranet" by Rick Easselberry (Que, \$49.99). "Introducing Intranets" by Gordon Benett (Que, \$24.99). To order: (800) 428-5331, pr link via our online edition at http://www. computerworld.com/intranets.

Netscape's James Barksdale on Informix.



INFRASTRUCTURE

PROJECT



Chrysler Corp.

Auburn Hills, Mich.

\$53 billion automaker

At Chrysler Corp. (http://www. chryslercorp.com), intranets are more than just a pretty interface. "You really need to focus on infrastructure," says CIO Susan Unger. "You'll need it."

To date, the automaker has seven major corporate intranets. One serves 6,000 engineers. Another enables activity-based costing for financial users. A third, built for public relations, extends into a public Web site for journalists.

Led by Unger, small teams are actively identifying gaps in Chrysler's enterprise infrastructure. "The hard part is knowing where the gaps are," she says. "Does it really warrant investment or not? We try to make a clear business case why it's important to have. It [isn't] just the intranet development for its own sake."

The company plans a 15% to 20% annual increase in network capacity, in part to handle intranet growth, she says.

ROLES

IS pays for infrastructure and networks. Application costs are split with user groups. Intranet development is decentralized; there are now seven developers. Joint/rapid application development, business process redesign methods are used. "The customer has to be the content owner. In some organizations, that's fallen on the shoulders of IS. Our responsibility is to provide the technology."

PEOPLE CHALLENGES

"Our biggest adjustment was 21/2 years ago when we fully endorsed client/

server. That was a huge training issue. We've gotten over that hurdle; this is almost easier to handle. We don't view training as a big problem. It doesn't take long to pick up the appropriate training. You can go in a week and become a webmaster. It's really exciting."

TECHNICAL CHALLENGES

Software that's poorly Web-enabled and difficult to integrate is a challenge. "When you start trying to hook up a number of software products, they don't work. You could probably do some integration if you really wanted to do that work. But do you?"

PAYOFF METRICS

Better cycle times, speed of delivery, improved quality are results. Another plus: speedy development. Time to create some apps was cut from six months to two weeks. "It's incredible. People had never done a Web site before, and it took a total of two months to entirely complete it — and that included the learning curve and specing it."

TOOLS

"We look at tools and how easy are they for my people to use and for the customer to use. If I have to throw them away a year from now, it's not a big problem."

PROCESS

"We did an intranet and Internet for our PR organization. It started with a really small target group and pilot group. We're now [reaching] up to over 300 journalists. As Chrysler information is released on the newswire, it's simultaneously relayed on the Web site, organized by subject areas, press releases, facts, biographies. Before building that, I had my people go out and watch [the PR people]

work and follow the flow and what they were doing. We took that process."

LOTUS NOTES AND INTRANETS

Using an Internet/intranet system is cheaper and the developer skills are easier to learn than with other systems. "Netscape is more open. Lotus Notes is hard to administer but better than Netscape. Servers have been hard to administer. Directory services had been a nightmare. But it's not all that bad in the intranet environment."

EDI

"We require EDI on the buy side. For EDI on the sell side, it makes more sense down the road to go the Internet."

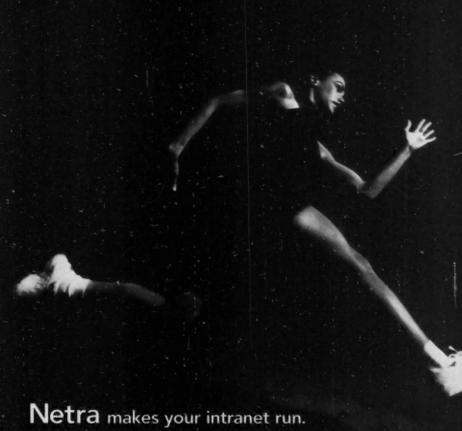
ADVICE

"You need to actively push the organization if they are not into it. The network is the computer; you really need to understand that from a development point. We're almost pushing our customers maybe more than they would like. You need a very iterative process in which you do things quickly and throw it away. This is a big change of mind-set."

— Joseph Maglitta

CHRYSLER CIO

CHRYSLER CIO SUSAN UNGER: "You need a very iterative process in which you do things quickly and throw it away. This is a big change of mind-set."



Netra makes your intranet run.

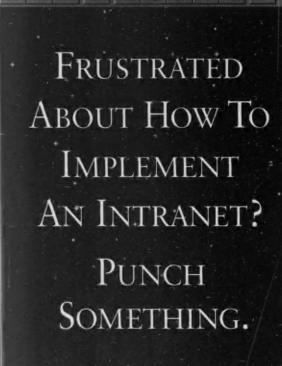
Netscape and Java

make it someplace you want to go.

Intranets. They streamline communications and give your company the edge it needs to compete. That's why we created Netra i," the servers built exclusively for the intranet. Each comes with essential software that make deployment and management a cinch. Software like JavaScript and the Java* Developers Kit so you can begin developing and using applets and applications right away. Tools like Netscape* Navigator Gold for authoring, Netscape Enterprise Server for world class web serving, and Netscape LiveWire for management. In one stop, you have everything you need to manage, create and control your intranet applications. Little wonder Netra i is the choice of intranet professionals and where your business truly wants to go today.

To learn more, contact http://www.sun.com or 1-800-786-0785, Ext. 385. THE NETWORK IS THE COMPUTER*

20196 Lin Minosystems In: All right reserved. Siz, Sur Microsystems, the Size Injectives, and the Size Injective are trademark or registered trademark or Size Microsystems, the All right reserved. Size, Size Microsystems, the Size Injective American Size Minosystems, the All right reserved. Size Microsystems, the Size Injective American Size Minosystems, the All right reserved. Size Microsystems, the All right reserved. Size Minosystems, the All





1-800-409-6224



Trying to find accurate information in the midst of all the intranet hype is a challenge. Relax. You'll feel a lot better when you

get the facts from the industry experts. Call for your free Forrester Reports on intranets and Web server software. Both analysts and the trade press agree, if you're building an intranet, you need to consult Netscape.

Forrester defines Full Service Intranet as: standardized e-mail, directory, file print, and network management. Netscape gets it. And with SuiteSpot it has begun to deliver on the vision.

-The Forrester Report
The Full Service Intranet, March, 1996

And PC WEEK said:

For corporations planning to use internet-based technologies for internal use, [Netscape] SuiteSpot is shaping up

-PC WEEK, May 13, 1996

Netscape's full range of intranet solutions provides greater functionality and costs less to implement than proprietary intranet solutions like Lotus Notes and Microsoft BackOffice. In fact, when Forrester polled professionally managed Web sites, 80% indicated they had chosen Netscape.

So call, or visit our Intranet Solutions site at home.netscape.com to find out for yourself. And breathe a sigh of relief.



NETSCAPE

Find Training now.



Have you seen your agent today?

Computer Careers

Online this week COMPUTERWORLD

For Visual Basic hiring and salary projections, go to our Web site: www.computerworld.com

VISUAL BASIC

Hiring managers
agree: Visual Basic
promises to be the
runaway top
development tool
next year

By William Spain



here seem to be only two constants in the information systems job market: the demand for skilled workers far outstrips the supply, and what's hot today may be frozen next week.

The trick for IS professionals is to stay on top of the career opportunities for various technology skills and to invest in the right ones. One skill that has been much in demand is Microsoft Corp.'s Visual Basic. And according to the forthcoming Computerworld survey of IS hiring managers, it will remain so for the immediate future. In fact, managers say it will be the most sought-after development skill. What follows is information on how to get it, what it's worth and where it might be going.

BY POPULAR DEMAND

"Demand for every IS skill is increasing at an exponential rate, and Visual Basic is right up there at the leading edge of it." — Shannon Brandon

From Atlanta to Dallas to Phoenix, the high demand for Visual Basic skills shows no signs of slowing, says Shannon Brandon, director of the professional services division at Matrix Resources, Inc. in Atlanta, a recruiter and consultancy with offices in the South and Southwest. Indeed, Computerworld's annual skills survey (to be published Nov. 18] finds it will be the most hired-for development tool next year.

"We're seeing it all across the board — everything from manufacturing to banking to service organizations," Brandon says.

Add to the above most-wanted list all of the Atlantic Coast and the industrial Midwest, says Jack DeTurk, president of DP Job Works, an Indianapolis-based recruiter. As DeTurk sees it, IS professionals with Visual Basic skills can land jobs in everything from "manufacturing applications to account and financial applications."

SHOWS WHAT YOU KNOW

"Demand is increasing because of the ease of being able to put an application together. It also shows that you've got a background in visual programming, period." — John Kile

Part of the reason for the sustained high demand for Visual Basic is its ease of use and versatility, says John Kile, a systems analyst involved in hiring at Eli Lilly & Co. in Indianapolis.

"A lot of the skills are transferable. If you know Visual Basic, [it's easier] to use PowerBuilder or

some other visual programming language." And "it's a good item to have on a resume," he says.

Peggy Martinus, Chicago branch manager at consultancy Greenbrier & Russel, says acquiring Visual Basic skills "is definitely a good career move. Some companies only use Microsoft skills."

PAYING THIS GAME

"Of the development tool skill sets, probably the highest-paying are Visual C++, Visual Basic and PowerBuilder." — Shannon Brandon

Investing in Visual Basic can certainly pay off in the weekly paycheck, Brandon says. "Visual Basic may not be the highest paid of the three, but it's right up there close to it," she says.

Computerworld's skills survey reveals that Visual Basic premiums paid to permanent staff range from 3% to 16% of salary, depending on the region and the nature of the work.

Bruce Masserman, a partner at Jersey City, N.J.-based Aux Technology, Inc., agrees. "There are a limited amount of people who have the wide variety of Visual Basic skills." But he says to command a salary premium, "you really have to have C++ or something else to go with it."

That premium may not come directly from an employer, however. There appears to be an increasing trend of firms going outside their ranks to fill their needs for Visual Basic skills. Contract consultants, according to the survey, can command salary premiums of 5% to 18%.

"As outsourcing continues to develop, the compensation level for what we like to call permanent employees probably gets pretty close to a standstill," DeTurk says. "Contracting inevitably drives

internal salaries and wage increases down."

EASY TO COME BY

"Visual Basic is a tool that a lot people can pick up on their own. Individual programmers can buy the tool, and it's not expensive." — Peggy Martinus

There seem to be almost as many ways to come by Visual Basic skills as there are applications for them, from home study to on-the-job experience to formal classes.

Martinus says employers often foot the bill for training. But even when they don't, "it certainly isn't a hard class to come by," she says.

Brandon says most of his Visual Basic people "are younger. ... In general, our primary candidate base is [people who] just came out of school."

No matter how it's learned, it's clear that any investment of time or financial resources in Visual Basic will pay for itself in short order.

SEEING THE FUTURE

"Right now, the short-term demand is pretty hot. It is definitely still a tool of choice. But in three years, in two years, who knows?" — Bruce Masserman

Masserman says "short-term demand is still pretty good because of all the shops that went with [Visual Basic]. But as companies enhance those applications to the next level, some people will go with them, and others will be going the way of the Cobol people."

Keeping in mind the aforementioned constants of the IS world, it's difficult to tell what the longterm appetite for Visual Basic will be.

The near future is easier to predict because projects already under way rarely change horses in midstream, and companies that have made large investments in a particular tool are unwilling to lettison it too soon.

Brandon is a bit more confident. "We don't see demand slowing down any time soon." After all, he says, "having the Microsoft name tagged onto it doesn't hurt."

Spain is a freelance writer in Chicago.

VISUAL BASIC ONLINE RESOURCES

The Visual Basic Jobs Page

www.apexsc.com/vb/jobs.html Features job postings and links to other resources.

Careers Online

www.colinc.com

Has job listings for permanent and contract work in various IS disciplines, including Visual Basic.

Recruiting-links.com

www.recruiting-links.com Has a wealth of job links to employers.

High-Tech Resources, Inc.

www.mindspring.com/hi_tech

Features a national technical search firm that specializes in data processing technologies.

Net-temps

www.www.net-temps.com

Features a searchable jobs database with hundreds of Visual Basic postings.

By the Book

A variety of new titles for career-minded IS professionals



How to Get Your Dream Job Using the Internet

By Shannon Bounds and Arthur Karl The Coriolis Group, Scotsdale, Ariz.; 350 pages, \$29.99 (paperback).

It might seem unlikely that a book that uses about one-third of its pages to introduce the Internet would be all that useful to information systems professionals. But How to Get Your Dream Job Using the Internet not only covers the full spectrum of its topic, but it also covers it in depth and with great care.

The authors have a broader focus than technology alone. Bounds is a marketing professional with expertise in the Internet. Karl is a computer professional with personnel management experience. Together, they are the online career correspondents for the national radio show, Log On U.S.A. Therefore, the book goes well beyond simply providing Internet navigation advice. It emphasizes tips for using the Internet with all the human factors of real-world job

Chapter 5, "How to Create a Killer Electronic Resume," is a must-read. It's chockfull of cogent suggestions on presenting yourself via electronic mail, Hypertext Markup Language documents and traditional "snail mail" paper versions.

One specific suggestion: Avoid hardcopy resumes that are overly elaborate. Many companies use optical character recognition to scan resumes into a database, and unusual typefaces or extraneous design elements may make them unreadable.

The book also includes an ample selection of bulletin boards, uniform resource locators with job postings, listings of local Internet access providers and even an extensive tutorial on building your own World Wide Web page.

- Alan R. Earls



VROOM! Turbo-Charged Team Building

By Michael Shandler and Michael Egan Amacom Books, New York; 160 pages, \$14.95 (paperback).

The biggest asset and worst fault of this book are the same thing: It's a comic book with all the appeal and limitations of that medium.

You have to admire the audacity of the authors. They've taken a potentially dry subject and made it interesting by presenting it as a comic-book adventure.

In it, Harry Black is a beleaguered second-tier manager at Electromotion, which is trying to develop a high-powered battery for electric cars. But things aren't going well, and Harry gets the word from the boss that he's got a year to shape things up. Harry's solution is to create work teams. And it's through Harry's attempts to sell the team concept to the colorful members of his management group that the reader learns how teams are created and what makes them work.

There's great detail here, ranging from how to get people to buy in to the team concept to how to take personal responsibility for making teams work. Because it's a story, the book doesn't lend itself to browsing. The authors' accomplishment is that you will be interested enough in Harry's struggle to read the whole book, which is simply but gracefully written.

Information systems team members and managers can benefit from learning some of the basic requirements for making teams work. For example, team members need to be involved in making key decisions, and managers need to lead, not control, the team. Overall, this is an engaging introduction to team building. But it's too optimistic to be a practical guide to solving team-related problems. — Steve Alexander



The Virtual Office Survival Handbook

By Alice Bredin John Wiley & Sons, Inc., New York; 260 pages, \$16.95 (paperback).

Whether you are self-employed and work at home already or you work in a more traditional setting, this book offers lots of good ideas about an increasingly common way of life. Indeed, according to Bredin's sources, the 40 million people who already work at home at least some of the time will be joined by another 20 million virtual office mates by the end of 1998.

Professionals in areas such as sales were often first to escape from the corporate cubicles. Computer professionals, obviously well-versed in the technologies of virtual offices, aren't likely to be far behind.

But working in a virtual office demands new skill sets. Bredin, a writer who became fascinated by the phenomenon of the home office, has become a recognized expert on the subject. She writes a nationally syndicated column called "Working at Home," provides commentary on public radio's Marketplace show and hosts online forums on America Online and The Microsoft Network.

This thorough book omits little for someone considering home office options or seeking to make the experience successful and satisfying. Bredin discusses, for example, the personal characteristics needed to work amidst the distractions of home. She offers dollars- and-sense arguments and action plans for persuading bosses to lengthen the umbilical cord and let you work out of sight.

Even the bibliography is organized in a useful way: by chapter topics. So if you need more information on, say, organizing your office, Bredin suggests appropriate additional resources. — Alan R. Earls



Information Systems Position Description HandiGuide, Revised Edition By M. Victor Janulaitis

Positive Support Review, Inc., Santa Monica, Calif.; 445 pages, \$395; \$795 for book and electronic versions; \$895 for book and network electronic versions; shipping costs additional \$16.50 unless purchase is prepaid (paperback).

This book was designed to be used rather than read. It consists almost entirely of job descriptions for IS employees. It primarily targets corporate hiring managers and human resources professionals interested in spelling out what everyone's job is supposed to be.

The writing is clear and concise. As a result, this book will be invaluable to IS executives who want to fine-tune their organizations so that responsibility is sharply defined and performance is accurately measured.

Author Janulaitis, CEO of management consulting firm Positive Support Review, Inc. in Santa Monica, Calif., said in an interview that the book aims to fill a demand for better job descriptions. The book contains descriptions of 132 IS jobs, ranging from chief information officer to word processing operator.

The book describes each job's purpose, problems, essential functions, authority and educational requirements. It also explains whom the job holder will interact with in the corporation and what promotion opportunities exist. Career progression and compensation are two of the key reasons to pay close attention to job descriptions, Janulaitis says.

- Steve Alexander

appropriate Earls is n freelance writer in Franklin, Mass.

- Alan R. Earls

Alexander is a freelance writer in Edina, Minn.

APPLICATION PROGRAMMER: Develop, or interrests APPLICATION PROGRAMMER:
Develop, or integrate purchased,
statistic or integrate purchased,
statistic of the art research and a statistic of the art research and a statistic of the art research and statistic or integrated and statistic or integrated and statistic or integrated or in ability; and one currus covering colorior oriented design and pro-object oriented design and pro-colorior oriented design and pro-sent and pro-pro-sent and pro-sent and pro-sent

Computer

Lots of 'um.

Select]OBS .com

http://www. 954 424 0563

Programmer/Analyst (Jack-sonville, Fl. client slet; subse-quent placements throughout Florida) Analyze, design, develop, code, test, imple-ment, and maintain programs for commercial and financial applications systems, using COBOL, CICS, and ASSEM BLER in an IBM maintrame environment. Bachelor's De-gree in Comp. Sct., Engin., or Meth. + 1 yr. sep. in job. gree in Comp. Sci., Engin., or Math + 1 yr. exp. in job. \$37.500/yr, 40 hr/wk; 9 a.m. -5 p.m. Send resume to: Job Service of Florida, 2660 West Oakland Park Blvd., Ft Lauderdale, FL 33311-1347, Re: JO# FL-1510528.



e-mails you with the career opportunities you want.



Register today and use CAREERMAIL

http://careers.computerworld.com itCareers. Where the careers find you.

MANAGEMENT INFORMATION SYSTEMS DIRECTOR

The City of Portage, a progressive municipality located in Southwest Michigan, is seeking a highly qualified rish-levial of lift le position of Management Information Systems Director. This professional managerial position is responsible for operations of the Computer systems, information system and implementing, advancing technologies. The ideal cameration will have a strong background in main/rame/mini computing and programming (AS-600-PRO-G00) and network PCS-EAP-Powell Potentials, Price successific architecture. Niewell Netwarel. The successital candidates will have demok-sistent problems owing and planning salids, and conflortable operating in a demanding environment. Bachelor's Logical Business or Computer Science, Marter's Degree preferred. Work experience in the public sealor is a plan. The position officer a salary range of \$52,164 to \$2,350,56, and an excellent frings benefit prockage. Qualified candidates sond a require and letter of application including salary requirements to:

City of Portage

COMPUTER SOFTWARE Field Technical Support Analyst. Provide on-site tech support of Technical Support Analyst. Provide on-site tech support of Computer Software Softw

MA 01701-9171.

Systems Analyst (Consultant).
Develop custom business information systems based on Oracle relational database software & ROBMS applications of the Systems of the Systems of the Systems of the Systems of S

SOFTWARE ENGINEER.
Design, develop, debug, test, support a line of industrial input/output driver software, targeted to the end users of the Visual Logic Controller (VLC). MS Degree in Computer Science or Electronic Engr. two controller (VLC). MS Degree in Computer Science or Electronic Engr. two Computer Science or Electronic Engr. as Programmer Analyst must have included work with Microsoft SDK, Visual C++, MFC, IRMX, in real Lime environment. \$45,5000/yr., 40 hr. wk./Sam-Spm. Resumes to: 7310 W. Controll. MR 45002. Pet. 8 120696. Employer paid ad.

Software Development Engineer:

Software Development Engineer:

will create, develop, implement, and modify a multimedia (picture and data) computer-based image processing systems which allows a soft of video images of various jewel-ry for purposes of establishing a catalog of inventoried iarms for acting of inventoried iarms for try. Will insure that systems allow awaying of images in full motion in a MFEG. Tile format, including be controlled by capturing software systems in askidson to surving ethic pictures and one of the control of the

Programmer: Programs, tests, codes, develops, and modifies a codes, develops, and modifies a tatabams system for use in the banking industry Uses of CL and COBOL and other programming anguages including C in a UNIX gram modules in a banking linary control of the Common of the Commo

Systems Engineer wanted to provide consulting services in the form of LBMS system upgrades and application support for the CATA software system; provide expertise relating to systemistic consultation. Regs. M.S. in computer Science or Mech. Engineering and 18 mo. exp. in the job offineed or 18 mo. resteted exp. must include installation and support of IBM CATIA software system on UNIX workstations; and 18 ms. 5 pm. \$66,000 yr. Send resume 10. 7310, Detroit, M. 48202, Reference No. 126496. Temployer Paid Ad.

Information Systems Consultants

our goal:

"a positive balance of service,

technology, quality and value."

The Management Solutions and Services practice of Deloitte & Touche is experiencing extraordinary growth. We are providing opportunities for talented entrepreneurial consultants and client service professionals in our Grand Rapids office by offering them a unique fit in a practice with a different balance

Management Solutions and Services

Our Solutions practice provides financial, operations, and information management systems consulting services for emerging and high growth middle-market companies. Organized into local office practices, each are supported and guided by national strategies and core competencies in order to help clients evaluate and benchmark key performance measures, identify finan-

cial and operational improvements, evaluate, select, and implement information systems, assess the impact of financial, operational, and technological changes, and align information systems with corporate goals.

Our Information Systems Consultants help clients add value to their businesses with strategic and tactical planning for information systems, to anticipate the challenges and opportunities of systems advancements and global change. Specifically, this involves evaluating, selecting, implementing, and supporting application packages and platforms. Your qualifications must include a degree in Computer Science or other information systems-related degree, at least 3+ years experience, and an understanding of PCs, mid-range systems networking, and financial & operational information systems. Experience leading information systems planning, design, and implementation projects is also essential. Experience in several of the following: DOS, Windows, Netware, UNIX, AIX, OS/2, NT, TCP/IP, Progress, SQL Server, and

Send resume to: MSSGR/LT Deloine & Touche LLP Suite 900, 600 Renaissance Center, Detroit, MI 48243. We are an equal opportunity employer, m/l/d/v.

You can also find us at: http://www.dttus.com

We listen. We deliver.

Deloitte &

Touche LLP

Debutte Touche

Senior Systems Engineer: 40 hrs/wk., m-t, 8:30-5:00pm, 559,230yr. Conversion of maintrame legacy systems to cliently server environment. Development of the control of the

PROGRAMMER/ ANALYST

Growing consulting firm spe cializing in limith care soft ware, is looking for program mers w/6mo. to 2 yrs exp. ir COBOL on an IBM main frame with VSE/ESA. Please

CNG SYSTEMS Suite #327 Bingham Farms, Mt 18025 E-Mail:

Fax: (810) 901-3711

Software Excellence

Discover the Challenge

Momentum Software Corporation is a world class provider of message-oriented middleware. Its products enable end-to-end interoperability for mission-critical, high-performance, enterprise scalable applications. Momentum's explosive growth has created the following newly established positions which offer an opportunity to become part of an extraordinary team:

UNIX, Windows NT

Senior Software Engineer: 5+ years of demonstrable design / development experience. Capable and experienced in Windows NT or UNIX system programming, (not kernel, but IPC, systems threads, etc.), TCP/IP socket programming and C.

Junior Software Engineer: College graduate with minimum 3.5 GPA and at least 1 year demonstrable programming / development experience. Capable and experienced in Windows NT or UNIX system programming, (not kernel, but IPC, systems threads, etc.), TCP/IP socket programming and C.

Internet/Java Software Engineer: Develop communications software and "plug-ins" for Internet and Java. Must have 3+ years programming experience and strong Internet / Java background.

Momentum, located in suburban northern New Jersey, offers competitive nsation, full range of benefits, stock options and an exciting, dynamic

For immediate consideration, please fax your resume to: (201) 871-0807 Attention: Engineering, or call (201) 871-0077 wst. 337



...Defining the Future

MVS/VTAM

Senior Software Engineer: Must have the ability to architect and develop VTAM, network based applications that will interface with LU6.2 and TCP/IP. Must be able to communicate with CLGS (and DB2 is a plus) and utilize network programming. Candidate should know COBDL, Assembly, and some C.

CONTINUED GROWTH ...

.. tbat's the wisdom of Solomon.

For more than sixteen years Solomon Software has been providing PC-based software solutions to client compan providing Pt-based software solutions to client companies. Our continued growth has created positions for individuals who enjoy working with state-of-the-art technologies and are looking for an environment which encourages and rewards initiative, innovation and teamwork. Based at our corporate offices in FINDLAY, OHIO, we are seeking:

SOFTWARE ENGINEERS

Responsible for developing core technologies used in our award winning software by using advanced technologies and development tools, such as C++ Windows NT, Microsoft SQL, Visual Basic, Java and OLE. These positions require individuals who have Windows development experience and a bachelor's degree in computer science or a related field.

APPLICATIONS DEVELOPERS

PRODUCTION/INVENTORY/DISTRIBUTION MODULES

The successful candidate will be part of a team which develops Pc-based Production/Inventory/Distribution modules. This position requires individuals with 5 years of experience working with and/or developing Production/Inventory/Distribution systems. Knowledge of Windowsbased development tools is necessary. A bachelor's degree in business, MIS or computer science is desired.

In addition to an excellent working environment, In addition to an excellent working environment, Solomon Software offers an excellent compensation and benefits package, including profit sharing. For considera-tion, send your resume to: Solomon Software, P.O. Box 414, Findlay, OH 48839; Fax: (419) 424-4400; e-mall: carcers@solomon.com. Equal opportunity employer careers@solomon.com. Equal opportunity employer m/f/d/v. Visit us on the Web: http://www.solomon.com

GREAT PEOPLE. WISE CHOICE.

GREAT PRODUCTS. Solomon Software

Accounting Foe Tist Coverage Name On Business

Camping World, Inc., the nation's leading retailer of RV/Camping accessories is expanding MS operations at our corporate headquarters in Bowling Green, KY. Current needs are for a PROGRAMMER.

ANALYNT canable of providing leadership ANALYST capable of providing leadership and technical applications in the migration

to a UNIX and ORACLE environment.

Responsibilities include:

Design, develop, test, implement and maintain business applications.

Serve as a resource for technical support and

Required Oualifications Include:

• Bachelor's degree or equivalent experience is

Bachelor's orgace or Square required.
 1-2 years project experience in 4GL; Unix and rdbms Oracle preferable.
 Programming proficiency (COBOL 85).
 Good analytical skills.

Preferred Qualifications Include:

• Technical skills in Microfocus Cobol, Personal Oracle 7, Developer 2000.

Java, JavaScript, C, C++ is a plus.

• Experience in a team development environment.

ong interpersonal skills. ckground in retail or catalog sales is a plus.

Capitalize on this outstanding career opportunity with our dynamic organization by sending your resume with salary history in confidence to:

Camping World Attn: Human Resources/CP P.O. Box 90018 Bowling Green KY 42102 Fax: 502/781-8885

We promote a drug-free work place! • EOE

Software Engineer, 40hrs/wk, 8.00am-6.00pm, 844,600/year, 40pb/stills/wass, statistic engineering theory, using Oracle*DBA, Or

Systems Analyst (Metro Detroit) Analysis, design, development & performance of ORACLE relational database systems using ing ORACLE CASE tools, DE-SIGNER 2000, DEVELOPER 2000, VISUAL BASIC & C++ un-der UNIX SOLARIS operating system in WINDOWS NT client server environment. \$72,000/yr. Requires Master's in Comp. Sci. or MIS & 1 yr. exp. in job offered Send resume describing qualifi-cations to Mike Williams, Interac-tive Business Systems, Inc., 17197 N. Laurel Park Drive Suite #150, Livonia, MI #8152



Computerworld's Bay Area Corporate **Technical** Recruiting Conference!

Monday, November 4, 1996 Hotel Nikko, San Francisco, California

On November 4, 1996, you have a special opportunity to update your recruiting skills and network with recruiters in your area at the first-ever San Francisco area Corporate Technical Recruiting Conference, held at the Hotel Nikko, San Francisco, California.



A Full Schedule of Contemporary Topics

Continental Breakfast & Conference Registration

Concurrent Sessions:

Candidate Selection: How to Pick the Right People Br. William Swan, President, Swan Consulting

The Critical Importance of Soft Skills and the "Invisible Assembly Line" Todd Schmick, Priority Management Systems, Inc.

Immigration Issues David P. Berry, Esquire, Berry & Appleman

Proactive Recruitment Techniques Dave Drugman, President, Bay Cities Research, Inc.

12:15pm Luncheon Keynote: Industry Trends

Repeat of Concurrent Sessions

Town Hall Forum John Younger, President, y-net

6:00pm Program ends

Selected sessions include:

Proactive Recruitment Techniques

Dave Drugman, President, Bay Cities Research, Inc.

To remain competitive, today's technical recruiters need to be aware of the latest trends in sourcing and proactive recruiting. This in-depth session from a leading expert will explore this critical topic and will help you put your resources and expectations into proper perspective.



Town Hall Forum

John Younger, President, y-net

In this session, you'll not only be able to propose your specific questions for open discussion, you'll learn of real world issues and solutions from your peers. You won't want to miss this rare opportunity as John Younger, an expert in the HR field, leads us through this modern discussion of your recruiting topics.



For more information, call the conference hotline: 1-800-488-9204

Database and Software Engineers

We are looking for talented engineers to lead and participate in the design, development and deployment of large data warehouse, decision support, factory automation and manufacturing control tems in Washington:

- Considerate with 1-10 years of experience in Symmetric Development looking for permanent positions + looking BS, MS or Ph.D. in Computer Science Equations in OOA/D Demonstrated competency in C, C++, GUI design, Unix Familiarty with Forter; jear, HTML. Oracle, Informix, Objectivey, Corko OBB, CIE, SAP, Perl, GEM and SECS protected would be a plan

Vector is an equal opportunity employer offering competitive compensation, benefits, relocation assistance and training. For immediate consideration, MAIL, FAX or EMAIL your resume together with salary expectation to

Vector Consulting Inc.

Dept: H-1, #681 NE 77th Ave. Suite 275, Vancauver, WA 98662 FAX: (360) 892-2055 Email: VectorCl@IX.NETCOM.COM

Health First, the dynamic healthcare network that's expanding along Florida's Space Coast, has immediate opportunities for you to support our rapid growth!

Microcomputer Coordinator

Support our corporate implementation strategy including all aspects of HW acquisition, vendor relations, project scheduling, and customer satisfaction. Requires demonstrated project management experience. Novell CNA preferred

Systems Analyst, Applications

Deliver application implementation, trouble-shooting, documentation, project management and end user support. Requires 2+ years of hospital IS experience and knowledge of midrange UNIX processors. Familiarity with HBO preferred.

Systems Analyst, Database

Provide database implementation and administration for Oracle-based financial and human resources systems. Requires 2+ years of database administration experience in a midrange environment. Knowledge of PeopleSoft preferred.

ALL POSITIONS ALSO REQUIRE a Computer Science, Math or Business degree (or equivalent), and strong organizational, communication and technical skills

Think of us first for competitive salaries, great benefits and an ideal lifestyle setting! To find out more, please contact: Employee Relations, Holmes Regional Medical Center, 1350 S. Hickory St., Melbourne, Fl. 32901. Phone 407-676-7310. Pax 407-722-8587. ECE.

Health

Cape Canaveral Hospital
Holmes Regional Medical Center
Palm Bay Community Hospital

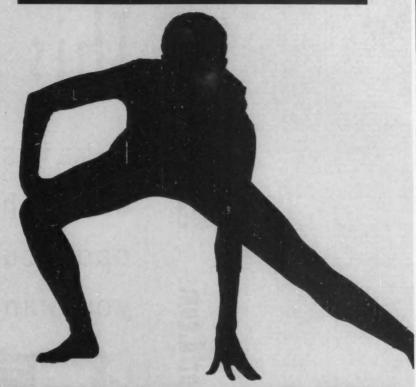
Search Computerworld's Archives



www.computerworld.com



LOVE INTERNETWORKIN



Leave me an email, and I'll pick it up remotely. I've got ISDN ... what? T-1?!!! (Show off!) Listen, I've gotta fly, but you can reach me anywhere.

- · ASIC Development/Verification
- · Product Warketing Managers
- · Applications Development
- · Information Technology Analysts

- Cisco Systems, Inc., Human Resources, P.O. Box 640730, San Jose, CA 95164-0730,
- FAX (800) 818-9202 (please use white paper with 12 point plain black
- E-mail: jobs@cisco.com (ASCII only), EOE.





http://www.cisco.com/jobs

TANDEM

COBOL, PATHWAY, TAL. SCOBOL, C. SQL, X.25

STRATUS MUMPS. UNIX

ttime/Consulting Positions STRATEM

800-582-JOBS TEL: (516) 677-9800 FAX: (516) 677-1950 EMAIL: 10m@strates

DATA PROCESSING Contract & Per CYBORG

- CYBONG
 IMM DIP DE UNIX Sys Admin / Novell / NT
 UNIX / C / C / Novell / NT
 UNIX / C / C / Armin Syban / Unix / Signal Basic / Armin Syban / Unix / Signal Basic / Armin Syban / Unix / Signal Colon | Nosin / Progras COBOL | CKC2 / DB2 |
 UNIX | Dission | Assembler / Banking

PROTECH

5545 Murray Road, Suite 300 Memphis, TN 36116 800456-5100 Fac 801-767-938 e-mail: protech@magibox.net

SAP We specialize in:

The placement of SAP rofessionals - all modules, ABAP, BASIS.

Contract & Permanent Position: Available Nationwide. We have low overhead so we can pay you top rates.

People Unlimited
1811 Sords Rd. N., Ste. 210

FLORIDA OPPORTUNITIES FOR DP PROFESSIONALS WITH:

IDMS/ADSO
TARDEBRITAL
RAM 5 OUYACC
MMPACCMMS/TSW
COBOL INDS/CICS
CAMADIANTERICAL
CARDIL INDS/CICS
CAMADIANTERICAL
CRYSTAL REPORTS/SQL
*ARVANTRAL/MTTP WEBICG:
UNKX SYSTEM ADMINISTRATOR
**ARVANTRAL/MTTP WEBICG:
**UNKX SYSTEM ADMINISTRATOR
**ARVANTRAL/MTTP WEBICG:
**UNKX SYSTEM ADMINISTRATOR
**COMMISSION AND ADMINISTRATOR
**COMMISSION ADMI FOR HAMEDIUTE CONSUMERATION CALL OR FAX RESUME YOU'VE

INFORMIX

Consulting Partner

Syslogic

(800) 797-5644 P.O. Box 26146 (813) 287-0054 Tampa, FL 33823 (813) 282-9511

SOFTWARE ENGINEER required. Design/development of Decision Support Systems in client/ of the control of the con

Software Engineer Design, develop, molement and test software for real estate portfolio management looftware and consulting using object-oriented and client server technique (angle object-oriented and client server technique), dispitical user with technique (angle object-oriented and client server technique). Toolis: Visual C++: Windows Windows NT: SEC server M-SI: Computer Science as well as 1 yr appelances in job offered or a supprisingue in job offered or a supprisingue in job offered or as experience mail includes Visual C++: Windows NT: districtives and object oriented design. 46 harwks, Sam-Sprin, SES, DOUIN 146 Laurimir Corporation, 707 Sikoles Send resume to Sas Smith 147 Cluarimir Corporation, 707 Sikoles Bud, Northbrook, Il 600026; 4674.



ittp://careers.computerworld.com

Consuliant. Design, develop, implement à tiest activans applications for management inforcation for management inforcations for management inforcations for management inforcations and the second sec

co, impolement 8, tase la stresse spojications of management spojications and spojication spojications and spojication spojications of management spojicatio

Systems Consultant. Analyze, design, devoice, miplement & design, devoice, miplement & design, devoice, miplement & applications. Work with IBM maintrame and celentiferer patentiferer of the programment of the control of the contro

PROGRAMMER, M.S. in Comp
ScriEdind' Egr. Pland'olypleatu
installifoce comp pgms, applying
knowl of pgmming tech, a comp
new or mostfillate pgms in delarment
measurement of most
measurement
meas

Consultant. Design, develop, implement ă test soft-ware for management information systems. Tools: Information systems. Tools: Informit; ESQL; C; C+++; UNIX; DOS. B.S. in Computer Sojence or Computer Engleneering as well aa 2 yrs exp. in job offered or as Programmer Analyst required. Previous exp. must include: Informix; SQL; C; C++; UNIX. 40 hrs./wk, 9am-Spm. \$54,000 yr. Send masume to: Amit Jain, Computer Discoveries, Inc., 2309 Sudbury Lane, Geneva, IL 60134. (630) 208-1373.

Software Engineer: Research design & develop software is edesign & develop software is edesign & develop software is procedures for scientific statists call software in a usualty of conclusion of the software s

This Web site

e-mails you with the career opportunities you want.



Register today and use CAREERMAIL

http://careers.computerworld.com

itCareers.

Where the careers find you.

You can reach the largest job search service dedicated to the computer professional. At home. On your computer. 24 hours a day, 7 days a week. DICE has contract and fulltime listings for Programmers. Analysts and Technical professionals

to fill open positions for companies nationwide

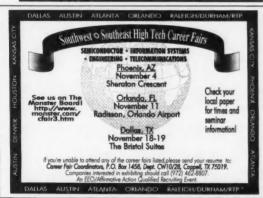
What's even better - we're FREE, providing detailed information so you can find the right contract or full-time position in your area AND your area of expertise. Take a look for yourself. Please contact DICE by calling any of these access numbers, using your computer & 1200-28.8 baud Modern, 8-N-1.

California	408-737-9339
Georgia	404-523-1341
Illinois	708-782-0960
lowa	515-280-3423
Massachusetts	617-266-1080
New York	212-482-4887
New Jersey	201-242-4166
Philadelphia	215-477-6050
Texas	214-691-3420
Virginia	703-560-8152
Internet	telnet dice.com

www.dice.com

DATA PROCESSING NDEPENDENT CONSULTANT'S EXCHANGE

Don't gamble with your job search. Use DICE. A Service of D&L Online, Inc: 515-280-1144



Principal Software Engineer responsible for dealey, dewategment and implementation of system software for a graphicavideo chip, will be a member of a chip architecture fearm and provide steinical leader and provide schenical leader and provide schenical leader processing software. Requirements are a Bachelor's Degree in Computer Science or Electrical Engineering plus 2 years appearance in the job oftend or design, development and maintenance of display driver soft-ware for graphics accelerators for the Microsoft Windows environment. Background in development and maintenance of display driver soft-ware for graphics accelerators for the Microsoft Windows environment. Background in development and the comment of the control of the con work week; 8:15 am to 5:00 pm M-F. Salary \$73,528.00 per yr M-F. Salary \$73,328.00 per yr. Send two copies of resume to Case #61256, P.O. Box 8968, Boston, MA 02114 EOE. Applicants must be U.S. workers eligible to accept employment in the United States on a full-time basis. EOE.

ATTENTION I.S. PROFESSIONALS!

and let all the consulting companies that are looking for your skillsets come to you. Assignments and/or position are available nationwide for absolutely all skillsets. And it couts you absolutely nothing! If you want the added advantage, mail or fax your resume to:

The Discovery System

P.O. Box 37075 Kumus City, Mo. 64138 FAX (800) 505-6293

Assignments: Contract W2 ◆ Contract 1099 ◆ Contract for Hire . Permanent Placement

Positions: Applications Programmer + Database Administrator ◆ Network Administrator ◆ Programmer/Analyst ♦ Systems Analyst ♦ Systems Administrator ◆ Team/Project Leader ◆ Technical Writer

HOGAN

Celebrating our 8th year of record setting net earnings, Norwest Corporation a diversified financial services provider with affiliates across the country. Norwest Services Inc. (NSI) cultivates a deep understanding of Norwest's Businesses and aligns the latest Technology to provide the ultimate in banking service and conveniences. The innovation and hard work of our teams are a true competitive advantage for Norwest, and an important ingredient in our ability to always go to the Nth degree for our customers. We have great opportunities to join our Hogan team in either Minnes lis, MN or Denver, CO. NSI will provide extensive training. The following positions are currently available:

·HOGAN SYSTEM **PROGRAMMERS**

(Umbrella): Experienced Systems Programmers or DBA's (knowledge of MVS, TSO, C lists/ REXX, using REXX, IMS. ENDEVOR)

HOGAN APPLICATIONS PROGRAMMERS IDS, CIS, PAS, ODS,

HOGAN BUSINESS ANALYSTS: CIS. IDS

If you're looking for a career in a stable and growing environment with a company that offers a great deal of opportunity, please send your resume and salary requirements to: Norwest Services Inc. Human Resources-Hogan Recruiting, 255 2nd Avenue South, Minneapolis, MN 55479 - 1049. Fax (612) 667-0673. E-mail: nts.hr@norwest.com.

For more information on Norwest visit our homepage at http://www.norwest.com.

> NORWEST SERVICES INC.

Equal Opportunity Employer

CONSULTANTS EDIATE INTERVIEWS

Natural 2 ideal ADW or IEF

CLIENT SERVER

Sybase

Testers

ort

Visual C++ + HTML/JAV/

TCP/IP

OOA/OOD

der + Help Desk

Mix Data

SS - CORBA

Peoplesoft

Rohn Rogers Consulting
Attn: Roger Sichel
1185 6th Ave, 30th FI, NYC 10036 Mww.rohn-rogers.com/rohn-rog 800-421-5158 212-921-1319 Fax 800-770-6360 or R. Michaels 1451 W. Cypress Creek Crown Center, Sulla: PLauderdale, FL 33 954-489-2700 Fax 954-489-64

ENABLING THROUGH TECHNOLOGY...!!

If you are looking for a challenge and an exciting opportunity...join the 17th largest pension fund in the US

The State Teachers Retirement System (STRS) of Ohio, a major public pension fund, has immediate opportunities for knowledgeable and results-oriented individuals. The Information Technology Services organization is seeking skilled professionals who will continue to advance a premier retirement system into the 21st century.

Investment Systems

Positions include:

Technical Architect (1 opening) **Business Systems Analyst (4 openings)**

Provide support and/or project leadership to the Investment and Real Estate Departments including research and development of technology solutions

Requirements:

Technical Architect

- Bachelor's Degree in Computer Science
 5-8 years' systems experience in investments or real estate,
- financial services
- Excellent communication skills with a strong customer service orientation

Business Systems Analyst

- Bachelor's Degree in Computer Science
 3-7 years' systems experience in investments or real estate, financial services
- Excellent communication skills with a strong customer service orientation

System Environment: Relational Databases PC Systems Architecture Mainframe: MVS, CICS, DB2, CASE

Lan: Novell, Windows NT, Windows 95, and SQL Server Desktop: Windows, Unix

Languages: PowerBuilder, Visual Basic, IEF Composer

Competitive compensation and outstanding benefits including Competitive compensation and outstanding betterns including health/dental/life insurance, relocation assistance, parking, on-site child care, fitness center, smoke-free environment, and much more! Send resume to: Marilyn A. Thomas, Assistant Personnel Director, The State Teachers Retirement System of Ohio, 275 East Broad Street, Columbus, Ohio 43215-3771.

> The State Teachers **Retirement System of Ohio**

apply2us@aol.com

Ioin in the excitement of our expansion.

MANAGEMENT

- SW Development Project Managers, Win/Mac/UNIX
- Network Project Managers
 MIS Project Managers STRATUS,
 PL/1, UNIX/C, C++

WEB

- Web Applications Specialists

· Web Postmasters

- **OPERATIONS**
- UNIX Systems Administrators
- Newsroom Support Special
 UNIX Network Operators

OTHER

- · Win/Mac/UNIX Automated
- SW Testers
 Technical Writers/Trainers

DEVELOPMENT

- · Macintosh, C/C++ Developers
- Windows, C/C++ Developers · UNIX C/C++ SW Developers
- PL/1, UNIX, C/C++ Programme
- C/UNIX SYBASE Developers

- Sr. Research Engine
- SAS Programmer Analysts

Opportunities are currently available in Northern VA, Needham, MA, Elmsford, NY and Newport Beach, CA.

For consideration, please send or fax your res Technologies Recruiting, Dept. CP1028, America Online, Inc., 12100 Sunrise Valley Drive, Reston, VA 20191. Fax: (800)392-8200; e-mail: apply2as@ael.com. Explore the AOL home page at www.nel.com. Visit our camer sin under "About The Company" for additional opportunities.
Or, call our Job Hotline at (800)392-8200. We are an equal

Your Future. Now Available at America Online



This Web site

e-mails you with the career opportunities you want.



Register today and use **CAREERMAIL**

http://careers.computerworld.com

itCareers. Where the careers find you. Start your day...

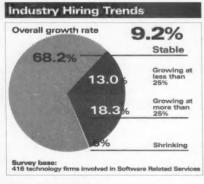


COMPUTERWORLD

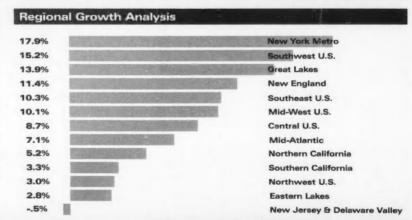
The Internet Connection for the IT Community

www.computerworld.com

Career Survey: Software Related Services



Survey conducted between July '96 and September '96;



CorpTech, a directory publisher in Weburn. Mass., tracks the U.S. 45,000+ technology manufacturers. This survey relates to the 31,439 tracked firms with fewer than 1,000 employees.

© Copyright 1996, Corporate Technology Information Services, Inc., Woburn, Mass

100%

ON-LINE

LIFE INS PIA'S AND BIA'S

SYSTEMS ENGINEERS PEX sys selms, config. network p. Will train in ORRECTE DBAc DEVELOPMENT MANAGERS

O/S DEVELOPERS

SYNON exp. can brog high SEE VA. NC, UT, FL, TX, MO

QUALITY ASSURANCE

For Life Work and Academi Experience Match your skills with a legal degree and transcripts. PROJECT DIRECTOR

"As you know experience is still the best teacher... But degrees agen doors."

Degrees for people who want to be more effective and secure in their Jobs or Professions.

Earn your BACHELOR'S, MASTER'S or DOCTORATE degree in Computer Science via the Internet. Com requirements on-line or through corresponde et. Complete all y

MS Computer Science

Design Your Own Emphasis Including:

- LAN Administration
- C++/ Visual Basic Programming
- Web Site Design
 Over 100 others

For over 20 years, we have successfully assisted our students to complete degree programs in their spare time, without formal classes or seminars.

me on work, life and academic experience for a FREE EVALUATION.



http://www.pwu.com

Pacific Western University (800) 423-3244, Ext. 9 Fax: (310) 471-6456

ROBERT SHIELDS AND ASSOCIATES P. Q. Box 890723. Houston, TX 800-423-5383 * FAX 713/486-1496 * em

Programmer Analyst (Eng. & Scientific), 2 positions open, 40 hrsiwk, 8-5, \$37.270/yr. Design & implement XINU kornels & device driver using C/C++ & ASSEMBLY under UNIX Design & control of the ASSEMBLY languages uson software using OOD methodologies & C/C++. CISC & RISC ASSEMBLY languages usoftware to amulate & monitor pointware to mulate & monitor pointware to install hardware interrupts on pesign & implement software for hardware components & microrocessors (to analyze signal processors to analyze signa thata from T1, E1, DSOA, & V35 processors to analyze signal state from 11. Et, DSOA, & VSS state from 12. Et, DSOA, & VSS state from 12. Et, DSOA, & VSS state from 12. Et al. Et al

Senior Programmer Analyst. Examine user requirements from a business perspective. Work independently & as a team memindependently & as a team member to develop detailed specifica-tions, code & Riest compise Pow-erfellulder applications using Powerscript & Sybase stored procedures. Develop & maintain technical documentation. Devel-op detailed nonweldige about selected activers application powerscript and process of the pro-selected activers application yellow pro-selected activers application yellow pro-selected activers application yellow pro-selected activers application yellow pro-posed B.S. in Computer Science as well as 1 yr exp. in job offered or as Programmer/Analyst required. Previous exp. must include client/ Previous exp. must include client/ server applications using Power-Builder, SQL & Sybase, 40, hrs/wk, 8:30em-5:00pm, \$44,000' yr. Must have proof of legal authority to work permanently in the U.S. Send resume tis: Joyce Faulkner, Joint Commission on Accreditation of Healthcare Organizations, 1 Renaissance Bland Cathority Terress, II

Blvd., Oakbrook Terrace, IL 60181. (630) 792-5000. Programmer/Analyst (Tampa, FL client site) Analyze, design, develop, test, implement and maintain programs for commer-cial and financial applica-tions systems using RPG/ 400 in an IBM AS/400 envi-400 in an IBM AS/400 environment. Bachelor's in Comp. Sci., Engin, or Math + 2 yrs. exp. in job. \$38,500/yr; 40 hr/wk; 8:30 a.m. - 5:00 p.m. Senting to Job Service of Florida, 2312 Gulf-To-State Plorida, 2312 Gulf-To-Superior Sci. 42418-4090, Re: JOB FL-1508646



nctional * Technical ABAP * BASIS Positions throughout the U.S.

Structured Logic Company, Inc.

1975 N. Park Place #100 nta, GA 30339-2004 800/599-9550 FAX: 770/937-0423

e-mail: slc11@aol.com

DEVELOPER/DATABASE ADMINISTRATOR required, Devolop client/server applications & GUIs client/server applications & GUIs Client/server applications & GUIS Client/server applications & GUIS Client and Client applications of Committee and Client applications of Committee and Client applications of Committee and Client a trom maintrainte using pipe unes proposition maintrainte using pipe unes Databases administration, data normalization & data & reternital integrity. Generation of graphical reports & charts using personal provide technical support to users. Bachelor's degree or its equivalent required in Math. year apportence in the job duties described altiwa. Must be willing to relocate to various unanticipated work sites throughout USA and work sites throughout USA adamy-\$50,000/year for a 40 salary-\$50,000/year for a 40 cants submit resume to Job Service of Florida, 2560 West Cants submit resume to Job Service of Florida, 2560 West Cants automit resume to Job Service of Florida, 2560 West Ad paid by an Equal Opportunity Employer.

SOFTWARE ENGINEER: M. S.
In Computer & Information
in Computer & Information
account of the Computer of the Computer
all degree requirements).
Designs, develops, modifies and
analyzes computer software system for business and industrial
applications. Must be knowledgeable in Structured Systems
edgeable in Structured Systems
structured in Structured Systems
edgeable in SOFTWARE ENGINEER: M.S.

VICE PRESIDENT SOFTWARE PRODUCT DEVELOPMENT

Our clean is the leading provider of demographic, and decision sup-port systems to the market research, direct marketing and targeted marketing industries. This international company is offering the right individual a unique opportunity to make a major contribution at the fore-firent of technology. They are seeking an experienced individual it design, build, and taunch their ment generation of marketing idention support software and fails delivery products on Windross 95 and 17. These systems involve the use of the inicial up-to-date technologies around Object Chabbases (OAGOO) the Internation 25 bit processor. rineas systems involve the das of the final up-product electricocycles around. Object Databases, Och/OOD, the Internet, 32 bit programming, Geographic Information Systems, ODBC, OLE/COM, SQL, Oracle, MS Visual C++, HTML, ActiveX, etc.

With offices conveniently located in Northern Virginia, you will be

able to walk to Georgetown for lunch, or run along the Potomac River if that's more your style.

To qualify, condidates must have:

A proven record of 10+ years experience bringing software products to market, with a particular emphasis on DSS client/server systems in MS Windows (16 and 32 bit). 5+ years management experience, with management of remote

resources a plus.
Technical expertise in C++, OOA/OD/OOP, MS Windows, tlata warehouse, client/server, OLE, application layer DSS issues, and the

Familiarity with VB, Geographical Information System and ODBMS a

Intite plus.

By Young State Consideration, please aend resume to: Bill Young State Consideration of the Sharerock Group S361 Old Courlbouse Rd, Suile 300, Vienna, VA 22182 Phone: 70398-0818 = FAIX: 703973-3612 E-mail: Bill, young dehamockorg.com account course constraint submission.

Gibraltar Consulting △ AGroup, Inc.

WE FIND JOBS

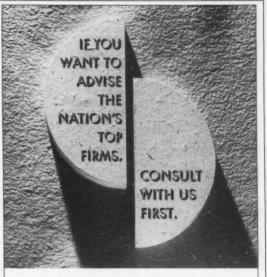
for

Information Systems Professionals

Permanent & Contract Salaries from 35k-125k

- Fortune 500 Companies
- · P/A's to VP/CIO
- Excellent Salaries
- · Great Benefits
- 150+ Positions Available

Call Today or Fax Resume: 1-800-748-7595 / Fax 615-383-7091 HTTP: www.gibrltar.com



The facts speak for themselves: Five hundred clients Twenty-five offices in the US and one in the UK. Over 3,000 technology consultants and still growing. Our broad client base and many locations gives us the foundation that allows us to offer you diverse assignments-diverse enough to fit your expertise and lifestyle. Check out our website for more information.



HTTP://WWW.COMSYSING.COM

Vice-President, 40 hrs/wk, 8:30-5 \$5,000/mo. Write proposals using detailed knowledge of technolog involved with data bass systems communications & software devel communications & software (level) opment, Manage ongoing projects in these arous. Team management to implement proposed tasks using project management tools. Guide/ an these areas. Team management to implement proposed faste using project management tools. Guided to implement proposed faste using project management tools. Guided (Inc.) and the proposed faste to the project teams engaged in high speed digital network, wide area network. Guideling the project teams engaged in high speed digital network, wide area network using this table to the project teams engaged in high speed digital network, wide area network using this table to the project teams engaged in high speed digital network, wide area network apply at the faste with the project teams engaged in high speed digital network. Wide area network as the project teams engaged in high speed to the project teams engaged to the project teams engaged in high speed to the project teams engaged in the project teams en

Software Engineer - responsible for graphics device drivers. Requirements are a Master of Science Degree in Computer Science with 1 year of experience in design and real drivers. Emphasis on the Internal operation of operating systems, device drivers, knowledge of computer activeticum. URIX compositions device drivers, knowledge of computer activeticum. URIX compositions of perating systems, device drivers, knowledge of computer active device drivers, knowledge of computer active device and internal operation of operating systems, device drivers, knowledge of operating systems, and internal operation of operating systems, and internal operation of operating systems, and in the perating systems of the perating systems of the systems

GREAT TECHNOLOGY JOBS IN DALLAS!

Transamerica Real Estate Tax Service, the nation's premiere tax service, has recently relocated its headquarters from San Francisco to Dallas. This move has produced a number of great openings. Join our leading-edge technology teams in one of the following positions:

- Programmer Analyst, PC and/or Mainframe
- Application Technician, AS 400 and/or Mainframe
- Senior Financial Analyst
- **Quality Control Analyst**
- Systems Performance & Capacity Planning Analyst
- CICS Programmer
- Database Administrator

We offer excellent relocation benefits.

Fax your resume, with salary requirements, to (214) 698-1480. Equal Opportunity Employer.

> TRANSAMERICA REAL ESTATE INFORMATION COMPANIES





Computerworld's Bay Area Corporate Technical Recruiting Conference!

Monday, November 4, 1996 Hotel Nikko, San Francisco, California

On November 4, 1996, you have a special opportunity to update your recruiting skills and network with recruiters in your area at the first-ever San Francisco area Corporate Technical Recruiting Conference, held at the Hotel Nikko, San Francisco, California.



A Full Schedule of Contemporary Topics

7:30am Continental Breakfast & Conference Registration

Concurrent Sessions:

Candidate Selection: How to Pick the Right People Dr. William Swan, President, Swan Consulting

The Critical Importance of Soft Skills and the "Invisible Assembly Line" Todd Schmick, Priority Management Systems, Inc.

Immigration Issues David P. Berry, Esquire, Berry & Appleman

Proactive Recruitment Techniques
Dave Drugman, President, Bay Cities Research, Inc.

12:15pm Luncheon Keynote: Industry Trends

Repeat of Concurrent Sessions

Town Hall Forum John Younger, President, y-net

6:00p.m Program ends

Selected sessions include:

Proactive Recruitment Techniques Dave Drugman,

President, Bay Cities Research, Inc.

To remain competitive, today's technical recruiters need to be aware of the latest trends in sourcing and proactive recruiting. This in-depth session from a leading expert will explore this critical topic and will help you put your resources and expectations into proper perspective.

Town Hall Forum

John Younger, President, y-net

In this session, you'll not only be able to propose your specific questions for open discussion, you'll learn of real world issues and solutions from your peers. You won't want to miss this rare opportunity as John Younger, an expert in the HR field, leads us

as John Younger, an expert in the HR field, leads us through this modern discussion of your recruiting topics.



For more information, call the conference hotline: 1-800-488-9204

This Web site

e-mails you with the career opportunities you want.



Register today and USE CAREERMAIL

http://careers.computerworld.com

itCareers.

Where the careers find you.



Marketplace

Switching: Next stop for Token Ring sites

By Lynn Haber

oken Ring customers are switching. Rather than battle congested networks and slow throughput, Token Ring sites are following on the heels of their Ethernet counterparts and buying switch technology to revitalize their network infrastructures and maximize their investments.

About a dozen vendors are vving for a piece of the world's Token Ring switch market, which is expected to reach \$255.9 million by year's end, according to Dell'Oro Group, a market research firm in Menlo Park, Calif. But the market is tapering off; it is limited by competing technologies such as switched Ethernet according to Dataguest, a market research firm in San Jose, Calif.

Breaking up bottleneeks

Token Ring switches let organizations segment their networks or structure them into a series of logical networks. That relieves congestion on the backbone or bridge, the most common throughput bottleneck in a Token Ring network. Network managers install Token Ring switches to further microsegment departments or workgroups or to increase bandwidth among servers.

Token Ring customers turn most often to a half-dozen leading vendors for switches: Bay Networks, Inc., Cabletron Systems, Inc., Cisco SysInc. and Xylan Corp.

But there's a lot of overlan among vendors' products, and the overall direction of the Token Ring switch market is unclear as vendors engage in cross-technology licensing agreements, buyouts and OEM deals.

For example, Cisco just completed its purchase of Nashoba Networks, Inc. Earlier it inked a deal to jointly develop products with Olicom USA. Inc. in Plano. Texas. Cisco sells its own switch, resells an IBM Token Ring switch and, until recently, resold a Madge Token Ring switch.

The good news from this vendor consolidation is twofold for Token Ring customers.

There are many high-quality, high-performance products from which to choose, and switch pricing has fallen and is expected to continue its slide, savs Kevin Tolly, president of The Tolly Group, a consultancy and testing laboratory in Manasquan N.I.

"Price should be a key determining factor for anyone in the switch market today," he says.

Basic features and functionality in Token Ring switches include the ability to handle eight to 12 ports; accommodation of 4M and 16M bit/ sec. Token Ring; support for fullduplex Token Ring; and high-speed uplinks to technologies such as Fiber Distributed Data Interface and Asynchronous Transfer Mode.

THE TOP SIX TOKEN RING SWITCH VENDORS

Products are listed in order of market share

BAY NETWORKS, Santa Clara Calif. TEL: (800) 222-7611 INTERNET ADDRESS: www.baynetworks.com MARKET SHARE! 42.1%

PRODUCTS: Centillion 10 Token Ring Workgroup Switch, starts at \$6,295; Centillion 100 LAN/ATM Switch, starts at \$1,995.

IBM, Research Triangle Park, N.C. TEL: (800) IRM-CALL

INTERNET ADDRESS: www.raleigh.ibm.com MARKET SHARE 18.1% PRODUCTS: 8272 Nways Token-Ring LAN Switch, Model 108 (eight ports) \$5,600; Model 216 (16 ports) \$9,995; 8251 Campus LAN, (4-port Token Ring UTP/STP module, includes base unit) \$11,290.

MADGE NETWORKS, San Jose, Calif. TEL: (800) 876-2343 INTERNET ADDRESS: www.madge.com MARKET SHARE: 12.3%

PRODUCT: Smart Ringswitch, \$1,079 per port.

CISCO SYSTEMS, San Jose, Calif. TEL: (800) 553-NETS INTERNET ADDRESS: www.cisco.com MARKET SHARE: 11.7%

PRODUCTS: Catalyst 1600, eight ports, \$16,600; Catalyst 2600. 16 ports, \$9,995; Catalyst 1800, eight ports, \$9,995.

CABLETRON SYSTEMS, Rochester, N.H.

TEL: (603) 332-9400

INTERNET ADDRESS: www.cabletron.com
MARKET SHARE: 7%

PRODUCTS: ATX multiprotocol LAN Switch; 20 ports (four ports per card, five slots) of Token Ring switching would cost \$1,700

XYLAN, Casablancas, Calif. TEL: (800) 99-XYLAN

INTERNET ADDRESS: WWW.xylan.com
MARKET SHARE: 5%
PRODUCT: PizzaSwitch TR, 20 ports, \$579 per port; OmniSwitch
series Token Ring switch module, six ports, \$1,400 per port.

Ring switches varies, mostly because IBM and 3Com Corp. dropped their per-port pricing into the \$500 to \$600 range. Other vendors' products average \$900 per port or higher.

Price drop

Analysts expect per-port prices to drop to the \$300 range next year. Vendor competition and alternative technologies are fueling price erosion in the Token Ring switch mar-

"Companies that are installing networks are installing switched 10M bit/sec. Ethernet and 100M bit/sec. Ethernet," says Trudy Barker, a principal analyst at Dataquest. Some companies with Token Ring networks will make the leap from Token Ring networks to Ethernet networks. But more firms are likely to install Token Ring switch technology for many years to come, Tolly says. As the price per port for Token Ring switches approaches that for Ethernet - in the \$200 range - customers have less incentive to migrate to Ethernet.

"Trading in a Token Ring network for Fast Ethernet isn't as easy as it sounds because the two technologies have different frame formats, which makes bridging between them difficult," Tolly says. ■

Haber is a freelance writer in Norwell.

COMPUTERWORLD

A FREE SERVICE for our

Vendor Center

3780 RJE Emul	ation ext. 51
Client/Server Development To	ools ext. 50
Communication	ns/E-Mail ext. 50
Groupware	ext. 51
Network Manag	gement
PC-to-Host Con	nectivity ext. 52
Remote Access	ext. 51
Security	ext. 51
Terminal Emula	ation ext. 51
Utilities/Antiviru	us ext. 50
Year 2000	ext. 51

Bac	:k-up/Tape/Disk	axt.	216
	oinets/Racks/		
Des	sktop PCs	axt.	201
Fur	niture	ext.	220
Kio	sks	ext.	21
Ma	inframes	ext.	215
Mie	drange	ext.	219
Pre	sentation/		
	ojectors/Panels		
Rej	pairs and Maintenance	ext.	22
Sec	curity	ext.	21
Ser	vers	ext.	21
Spa	ark Microprocessors	ext.	22
Sto	rage/RAID/		
	T/Optical	ext.	20
Tap	pes/Disk Drives	ext.	20
Wo	orkstations	ext.	20

Networking/Communication:
Client/Server Tools ext. 603
Diagnostic/Testing
Equipment ext. 629
Ethernet ext. 623
Groupware ext. 606
Hubs ext. 628
Internet Products/Services ext. 634
Network Hardware ext. 619
Network Management ext. 607
Network Software ext. 618
Networking/Communications
TCP/IP Applications ext. 626
Remma Access
Security ext. 632
Storage/Cabinets/LAN Racks ## 615
Switches/Gateways/
Bridges/Routers ext. 612
Windows NT ext. 617

Services	100	
Consulting/Contract Programming		ext. 703
Conversions		ext. 707
Data Recovery		ext. 708
Outsourcing/Remote Computing		ext. 706
Training/ Software Support		ext. 704
Year 2000		ext. 710

Internet/Intranet				
Application Development Tools ext. 330				
Browsers ext. 305				
Consulting ext. 308				
E-Mail Gateway ext. 311				
Encryption ext. 312				
Firewalls ext. 314				
Security ext. 322				

(800) 447-0018

Get detailed product information direct from a variety of manufacturers.



Why Buy Boxlight

- Over 50 models in stock
- Knowledgeable sales people
- Projectors from \$2,999
- Panels starting at \$1,499
- FREE Lifetime technical support
- 30-day money back quarantee
- 11 years of experience and service

http://www.boxlight.com



PRESENTING A BETTER WAY TO

Look Bright Overnight!

REVOLUTION 3600

800×600 SVGA **Power Zoom Focus** Video Capable

500 ANSI Lumens Wireless PC Mouse PC and Mac Compatible

Call Today and We Will Have You **Looking Good Tomorrow**

Looking for a guick way to improve your image? Our new Revolution 3600 projector is the lightest, brightest high-resolution



projector you can get. We can even set you up with a rental or arrange a low-cost lease. Is 10am tomorrow soon enough?

CALL 1- 800 -762-5757 TODAY

Monday - Friday, 6am - 5pm PST, Purchase orders accepted. Prices subject to change. Quantities may be limited to stock on hand.

🗺 👼 🏧 🥌 🔳 *30-day money back guarantee does not apply to Resellers.



International: (360) 779 7901 Resellers: (800) 736 6956 Rental: (800) 736 6954 Education: (800) 689 6676

Attention SynOptics System 3000 Customers

New Ethernet Desktop Switching, Shared Fast Ethernet Modules,

A Special Limited Time Offer For System 3000 Customers Only!

Visit our Web site at: http://www.baynetworks.com/s3000 or call 1-800-231-4208 or your local reseller for more details.



A Great Buy Opportunity!

Multiplatform

Supports any combination of PC, Macintosh, and Sun computers. Use any platform's peripherals to access any type of computer in the system.

Up to 4 users can access different computers simultaneously!

Multimedia

Every user has full multimedia capabilities; keyboard, mouse, video, microphone, speakers, and serial support available.





COMMANDER 4

Cybex Computer Products Corporation 4912 Research Drive Huntsville, AL 35805 1-800-932-9239 (205) 430-4030 fax http://www.cybex.com



Product Specialists

Pretested equipment Flexible financing

Configuration planning

Offices nationwide

Overnight shipping

Technical support

Dealer Program Available

Made in the USA

Distinct NFS 95

Easiest way to Share Files, Programs and Printers



Highlights:

- Integrates seamlessly into Windows 95
- . Mounts NFS drives from Explorer or **Network Neighborhood**
- . Supports file and record locking
- Allows central authentication with a single server running PCNFSD for all NFS connectivity
- · Prints to NFS or LPD print servers
- · Allows login to all systems with a single login name and password or different login names for each system
- · Allows single-operation logout of all systems accessed through Network Neighborhood
- Fine tunes performance parameters for each server you access!







408.366.8933 http://www.distinct.com 408.366.0153

Fax: Fastfacts: 408.366.2101

Looking For The BEST Company To Give You The BEST Value In IBM Computer Hardware?

We're IBM Experts:

- ·RS/6000
- ·ES/9000
- ·AS/400
- Series/1
- **Networks & Integration**

Sales & Rentals

- √ Processors
- √ Peripherals
- **Upgrades**
- Reconditioned





Buy • Sell • Rent (800) 888-2000

Has a SMALL BUSINESS DIVISION which has serviced over 165 diverse clients. It specializes in providing VM, MVS, VSE service to clients who need:

•OUTSOURCING (Up to 10 MIPS) *REMOTE COMPUTING •TAPE CONVERSIONS

SYSTEMS INTEGRATION CONSULTING

YEAR 2000 SERVICES: Impact Studies and Automated Tools

*Financial Services *Non Profit *Software Developers •Healthcare •Manufacturing/Distributing •Publishing

We are the "Boutique" of the Computer Services World (201) 319-8787 • (800) 274-5556

DATA INTERCHANGE and BACKUP SOLUTIONS SPECIALISTS

HP SGI MAC

AS400

RS6000

NETWARE







DEC SUN ATAT SPARC UNISYS

The World's Best Tape Drives from the Tape Experts
QUALITY PERFORMANCE VALUE







JUALSTAR

1-800-468-0680

TEL: (818) 592-0061

GET NOTICED!

Place an ad in Computerworld Marketplace!

94%

of subscribers read or notice the Marketplace section each week!

> To get your ad noticed, call (800) 343-6474, ext. 7744

MARKET PLACE

IF YOUR TECHNOLOGY ORGANIZATION COULD MAKE MONEY ...

You've developed a software application that's in production today. Now it's time to recoup some of your investment.

We resell software for companies like yours. We do the sales and marketing – you pocket the royalties!

Send us a brief description of your software ... we'll talk!

MESH Business Solutions, Inc.

Application Marketing Services 155 North Main Street New City, New York 10956 FAX (914) 634-8726

DATA RECOVERY: 800 440-1904

Seven good reasons to choose DriveSavers:

- 1. We're the most trusted and respected Data Recovery Specialists
- 2. We offer 24-hour, onsite, and weekend service
- 3. We've developed proprietary techniques so advanced we can retrieve data others might simply abandon
- 4. We're certified by most major drive manufacturers to maintain drive warranties
- 5. We've been restoring data-and peace of mind-since 1985
- Our amazing data recovery success stories have been featured in dozens of magazines and newspapers from Forbes and USA Today to The Los Angeles Times, and television shows such as CNN, CINet, NextStep, and MS/NBC
- We specialize in all storage devices; DOS, Win95, WinNT, OS/2, Mac OS, UNIX, Sun, SGI, Novell

Call when you need us, or visit DriveSavers at: www.drivesavers.com



Advertiser's Index	Address (All to	Page
Alicomp/CBS	(800) 274-5556	
Bay Networks, Inc.	http://www.baynetworks.com/s3000	
Boxlight Direct	http://www.boxlight.com	
Cybex Computer Products Corp	http://www.cybex.com	
Dempsey		
Distinct Corp		
DriveSavers	http://www.drivesavers.com	
Qualstar	http://www.qualstar.com	

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld
Marketplace's
MarketValue
Program can
help you get
more for your
advertising dollars.

110

Fill out and fax back this form to find out how!

yes!

I want to add value to my marketing program.

Please send me more information on the following:

- ___ Computerworld Marketplace
- ___ Computerworld Marketplace
- Vendor Center Leads
- ___ Computerworld Buyer Leads
- ___ Ad Readership Studies
- __ Computerworld Subscriber List
- Additional Ad Sassa
- ___ Additional Ad Space
- ___ Trade Show Counter Cards
 ___ Reprints

Name

Name ___ Title

Company

Address

Phone_

Fax

Email

Product

Simply fax this form to (508) 820-0941, or give us a call at (800) 343-6474, ext. 7744.

Advertisers' Index

The second second	Control of the Contro
Acer America	ComNet
http://www.acer.com ADP Inc	Micro Focus
Advanced Logic Research	Micron
Amdahl56-57 http://www.amdahl.com	Microsoft
AT&T	Motorola
Axil Computer, Inc	NCR
Comdisco	(800) CALL/NCR x3000 NEC Technologies
Compaq Computer Corp 18-19, 32/33 http://www.compaq.com	http://www.nec.com NetManage
Computer Associates	http://www.netmanage.com
http://www.cai.com Compuware	Nokia Display Products
DB Expo	Novadigm
Dell	Open Market
Digital Equipment Corp	http://www.openmarket.com
EDS	Oracle Corp
EMC Corp	Pacific Bell
Exide Electronics	ParcPlace
Hewlett-Packard	Powersoft
Hyperion Software	Progress Software
IBM	Pure Atria
In Focus Systems	SAS Institute
Information Builders	Siemens Rolm 58-5 http://www.siemensrolm.com
Informix Software	Silicon Graphics Com
Intranet Series	Sprint
Kingston TechnolgyC4 http://www.kingston.com	Stream International Inc
Lawson Software	Tivoli Systems
Logic Works	Unisys
Lotus Development Corp	Vanstar

To have your Internet indicase listed here, please contact Paula Wright at (508) 620-7716 This index is provided as an additional service. The publisher does not assume any liability for errors or om

Have a Problem With Your Computerworld Subscription?

We want to solve it to your complete satisfaction, and we want to do it fast. COMPUTERWORLD, P.O. Box 2043, Marion, Ohio 43305-2043. Your magazine subscription label is a valuable source of information for you and us. You can help us by attaching your magazine label here, or copy your name, address, and coded line as it appears on your label. Send this along with your correspondence. Address Changes or Other Changes to Your Subscription All address changes, title changes, etc. should be accompanied by your address label, if possible, or by a copy of the information which appears on the label, including the coded line. Your New Address Goes Here Address shown: □ Home □ Business Name Company

Other Questions and Problems

It is better to write us concerning your problem and include the magazine label. Also, address change are handled more efficiently by mail. However, should you need to reach us quickly the following toll-free number is available: 1-800-669-1002 Outside U.S. call (614) 382-3322). CompuServe members can reach us at account number 73373, 1230. Internet address: circulation@cw.com

COMPUTERWORLD allows advertisers and other companies to use the mailing list for selected offers see feel would be of interest to you. Was armen interes offers carefully fly out on an event is remain emile promotion list. Framingham, MA 01791.

Trainingham, MA 01791.

Computerworld, Inc.

President Gary J. Beach

Finance Matthew C. Smith

Executive Assess to the CFO/Presid Karen E. Elliot

Computerworld

An IDG Company: The World's Leader in Information Services on Information Technology

Executive Vice President/Publisher

An IDA Company: The word's Leider in information Services on information recumology
Exacutive Vice Provident/Publisher
Michael R. Rogers
Computerworld Headquarters: 500 Old Connecticut Path, P.O. Box 9171, Framingham, MA 01701-9171 Phone: 508-879-0700, FAX: 508-875-4394

Vice-President Salas/ Associate Publisher Editor David Peterson Paul Gillin

Marketing Bob Winter

Consumer Marketing Gail Odeneal

PUBLISHER'S OFFICE: Assistant to the Publisher/Lanren Austermann Manketing: Director, Marketing Communications/Mary Doyle, Senior Manager, Marketing Communications/Elizabeth Phillips, Manager, Trade Show & Conventions/Audrey Abbott. Marketing Manager/Susan Thaster, Marketing Communications Project Manager/Faren Lesko, Marketing Specialist, Emily Dinneen, Administrative Assistant-Patly White (EMCALTONE) Prierdo Circulation Management/Maurene Burke PRODUCTION: Production Director/Christopher P. Cusoc, Production Manager/Beverly Wolff SALES CLASSIFIED: Classified Operations Director/Cyrulia Delany USSITIBUTION Estribution Manager/Bob Wescott, Traffic Manager/Pat Walker INFORMATION SYSTEMS: Vice-President of IS/Walter Crosby

Sales Offices

Associate Publisher/Vice-President/Soles
David Peterson
Computerworld Headquarters: 500 Old Connecticut Path, P.O. Box 9171 Framingham, MA 01701-9171
Phone: 508-879-070, PAX: 508-879-0446

Regional Vice President: Sherry Driscoll, Senior District Man-agers Bill Cafigan, John Watts, District Manager: shabelle Kane. Sales Office Coordinator: Tammy Boisvert, Sale-Seisstants: Cherryl Stratton, Barbara Shuman, Diane McNeil, 470 Telter Pond Rd., 34h Floor, Waltham, MA 02154 (508) 87 0700 FAX: 617) 1890.2009 Hearing Impaired: (900) 428-8244

Senior District Managers: Fred LoSagio, Victoria Gonin, Miles Bachman, District Managers: Frey Cheney, Sales Ausistantes Susan Kusnic, Jean Dellarobba, John Radzniak, Mack Center 1, 365 West Passaic St., Rochele Park, VI 07682 (201) 587-0090 FAXC (201) 712-9786 Hearing Impaired: (800) 268-0288

Regional Vice President: Bernie Hockswender, Sales Assistant: Jennier Pattenaude, 1565 Woodington Circle, Sulte 201, Lauvenceville, CA 20244 (779) 931-8104 FAX; (779) 931-9106 Henring Impaired: 1609) 404-9474, Sentro District Manager: Mile Bachman, Sales Assistant: Mary Carallere, 175 Seratford Aue. #1, Wayne, PA 19076, (10) 975-638 FAX (10) 975-6482

Senior District Manager: Sharon R. O'Brien, Sales Assistant: Denice Richards, 875 N. Michigan Avenue, Suite 2846, Chicago, IL 60611 (312) 943-4266 FAX: (312) 943-2214

Custom Publications

Computerworld Journals

Associate Publisher: James Hussey. 500 Old Connecticut Path, Box. 9171, Framingham, MA 01701-9171 (5808) 879-0700 FAY: (500) 872-2264 East) Don Calamaro, 1856 Windsor Park Lane, Havertown, PA. 19083 (610) 446-5372 FAX: (610) 446-5753

Marketplace Adventising
des Manager/Michelle Reeves, Sales Assistant/Christine Tennes
ortheast Account Executive/Laurie Gomes, Central/Southeast
count Executive/Ann Meleney, 500 00d Connecticut Plah, Framgham, MA 0/1701-0171 (200) 343-6474 FAX: (500) 820-0841

Zip

State

Rame Title Address City

ingham, MA 01701-9171 (1900) 343-9474 FAX: (500) 820-0941 Western Account Executive/Claude Garbarino, 500 Airport Blvd., Suite 400, Burlingame, CA 94010 (415) 548-5544 FAX: (415) 343-5023 Gomputerworld Information Management Division Vice President/General Manager: Richard Mikita, Vice President; Joi Computerworld VAR Database: Carol Mullen/ National Sales Manager, Account Executive/Sean Weglage, (508) 879-0700 FAX: (508) 879-0184

Computerworld Buyers Database East: Regional Manager, Database Services/Linda Clinton, (508) 879-0700 FAX: (508) 879-0184

Computerworld Buyers Dente West: Regional Manager/ Gena Haas. (415) 347-0555 FAX (415) 347-8312

Alliance Maritating Pirector/Elizabeth Cooper, Sales Associate/Nancy Dillon, 500 Airport Soulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555 FAX: (415 47-8312 Senior District Manager: Darren Ford, Sales Assistant: Brenda Shipman, 14651 Dallas Parkway, Satir 304, Dallas, TX 75240 (972) 233,0882 FAX: 6972) 701-0081 Hearing Impaired: (800) 822-4918

Vice-President Western Advertising Sales:
Richard Espinoza, Senior District Managers: Ernic Chamberlani, Kaye Starlbrough, Linda Holfbrook-Dusay.
Christine Curry, District Managers: Isia
Kowalskii, Denyce Kebee, RR Representative: Letcia Lebnac, Operations Manager: Denise Hui, Account Decuritives: Shannan Dempsey,
Andrea Zurek, Sales Associates: Thurara Haney, Entmite Hung, Amy
Blechman, Todd Herrold, Marry Wajer-O, Olive Serverse; Jessica
Abade, Sales Coordinators: Yvonne Zuniga, 500 Airport Boulevard,
Sales 400, Burlingame, CA 84001 d415-042 2006. Exek. vaute, Sales Coordinators Yvonne Zuniga, 500 Airport Boulevard, Suite 400, Burlingame, CA 9010 (415) 347-9555 FAX: (415) 347-8512 Hearing Impaired: (800) 900-3179

District Manager: Nancy Coy-Bianchi, Account Executive: Susan Davis, Sales Associate: Pat Duhl, 2171 Campus Drive, Suite 100, Irvine, CA 92612 (714) 250 3942 FAX: (714) 476-8724

Display Advertising Production Manager: Paula Wright, Display Advertising Coordinators: Lisa Tanner, Gregg Pinsky, (508)-879-0700 FAX: (508) 879-0446

Recruitment Advertising Sales Offices Vice President/Recruitment Advertising/John Corrigan, Marketin Director/Derek E. Hulitzky, 500 Old Connecticut Path, Framingha MA 01701-9171 (800) 343-6474

MA 01/01-91/1 (800) 343-94/4
New England II Upstate New York: Regional Manager/Nancy
Percival, 470 Totten Pond Rd., 5th Floor, Waltham, MA 02154 (800)
343-6474, Account Executive/Nancy Mack, (800) 343-6474 Mid-Atlantic: Regional Manager/Marty Finn, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090, Account Executive/Carvn Dlott, (800) 343-6474 TDD: (800) 206-0288 South-Atlantic: Regional Manager/Katie Kress-Taplett, 8304 Professional Hill Drive, Fairfax, VA 22031 (703) 573-4115, Sales Manager/Pauline Smith (800) 343-6474

Manager/Pauline Smith (800) 343-644 Midsessit Regional Manager/Pat Powers, 1011 East Touhy Avenue, Suite 550, Des Plaines, IL 60018 (847) 827-9437, Account Executive/ Nick Burke, (800) 343-6474 TDD; (800) 227-9437

Southwest: Regional Manager/Ellen Cross, 4651 Dallas Parkway, Ste. 304, Dallas, TX 75240 (872) 726-4785; Account Executive Jim Parker, (800) 343-6474

Northwest: Regional Manager/Christopher Glenn, 505 Sansome St., 4th Floor, San Francisco CA 94111 (415) 676 3000, Account Executive/Fabiola Franz, (800) 343-6474

West: Regional Manager/Barbara Murphy, 2171 Campus Drive, Ste. 100, Irvine, CA 92715 (714) 250-0164, Account Executive/ Jeff Yoke, (800) 343-6474 TDD: (800) 203-5867

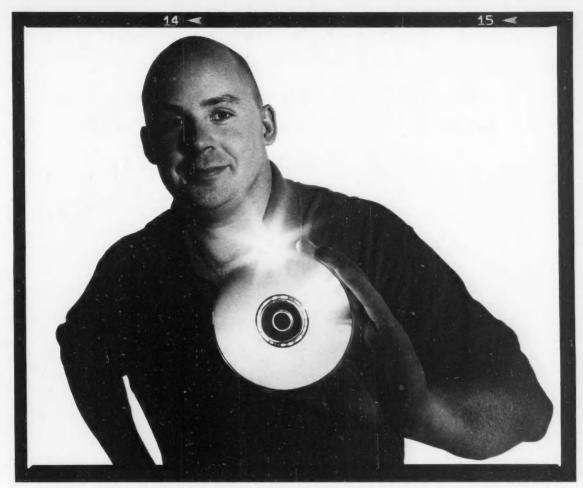
Internet Careers Site: Jay Savell, Account Executive, 500 Old Connecticut Path, Framingham, MA 01701-9171 (800) 343-6474 Direct Response Cards

National Accounts Director/Norma Tamburrino, Sales Associate/ Christine McGovern, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090

International Data Data

Chairman of the Board, Patrick J. McGovern; President, Kelly Conlin; Ehial Operating Officer, Jim Casella

erworld is a publication of International Data Group, the world's largest publisher of computer-related information and the global provider of information services on information technology, International Data Group publishes over 275 computer toos in over 75 countries. Sctyr million people read one or more International Data Group publications each more



"Upgrading one of my biggest clients' network to OS/2 Warp Server

was a flash of inspiration.

Speed

Tyrone Mills, the owner of DataWorks, a network management and consulting service in British

Columbia, had a problem. A big one, and it was with one of his biggest clients. A major health care provider was expanding and their network was running out of steam. Originally, Tyrone had installed a simple network operating system, which did most everything okay when the network was small, but now it was starting to run on empty.

That's when Tyrone decided it was time for OS/2° Warp Server. Everything he'd heard about it made him confident

that it would deliver exactly what his client needed. Like easy Internet and intranet connectivity, remote access, an ability to handle

big databases, and built-in management utilities that would make user account modification easy despite his client's high turnover of temporary workers.

Find out what made Tyrone see the light. Visit us at www.software.ibm.com/info/ea130 or call 1800 IBM-2468, ext. EA130, for details on the most inspiring software around.



Three more reasons to choose PowerPC technology.



PowerStackII for Windows NT, StarMax for Mac OS and PowerStackII for AIX

As if you needed any more reasons to choose PowerPC™ architecture, Motorola has launched an entire line of desktops, workstations and servers running on PowerPC technology, including systems for Mac®OS, Windows NT® and AIX®. So there are even more systems out there with the definite advantage of PowerPC performance. In fact, recent BYTE magazine tests proved that the PowerPC 603e™ and 604e™ microprocessors outperformed the Pentium® and Pentium® Pro, respectively.¹ Which is another good reason. And both the scalable design and technology road map of PowerPC architecture mean you'll have wider ranges of performance, power consumption and flexibility for years to come. Call 1-800-759-1107, ext. CW, or visit http://www.mot.com/computer/ to find out about PowerPC systems from Motorola and even more reasons to choose them.



Next week: Internet funds off to a good, but quiet, start

Finance & Investing

Opportunity knocks Wall Street sees big potential in

▶ By Rosemary Cafasso

formula: Because data warehousing

tinue to need tools to help get the job

done. Warehousing can be complex,

time-consuming and expensive. Typi-

cally, companies have stored data -

often obsolete, redundant or flat-out

wrong - in production systems for

databases is no easy task.

for investors.

tems, cleaning it up and storing it in new

ket will continue to grow and sustain a

slew of suppliers, and that's good news

Data warehousing involves the cre-

idea is to deliver corporate information

ation of databases for end users. The

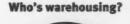
But that means the warehousing mar-

here's nothing easy about into the hands of users to help them data warehousing, as most make quicker, more intelligent decinformation systems pros will tell you. But from Wall pected to hit nearly \$5.5 billion in Street's perspective, that sounds like opportunity knocking. in Framingham, Mass. This is based on a simple

For an investor, there is a wide range of investment opportunities because efforts can be problematic. IS will conthe market has attracted such a variety of companies, from industry stalwarts such as IBM and Hewlett-Packard Co. to a plethora of upstarts such as Arbor Software Corp., an online analytical processing software vendor that went public earlier this year. years. Getting that data out of those sys-

Yet analysts caution that investors still need to tread carefully. Charles Phillips, enterprise software industry analyst at Morgan Stanley & Co. in New York, stresses that the data warehousing opportunity doesn't mean easy money. "Do your homework," Phillips advises. "Just because data warehousing is a hot theme, don't go in blindly. It

is dangerous to





BASE: 200 COMPANIES

Have an architecture and are actively warehousing

Have a warehouse architecture

Do not have warehousing plans

Source: Gartner Group, Stamford, Conn.

sions. The warehousing market is exworldwide revenue by the year 2000, according to International Data Corp.

try to ride themes. Know the companies you want to invest in."

data warehousing

Phillips and other analysts note that there are various investment approaches to consider for this market. Here's a look at three options

■ Make a conservative play: Select established database companies such as Oracle Corp. The company isn't a pure data warehousing stock, but it is a safer bet than some of the niche players because it has such a wide range of warehouse tools and is strong in markets outside of this arena, as well.

 Target some warehouse-specific stocks, but be careful. There are actually only a handful of publicly held warehousing companies, and performance has been all over the map.

For example, earlier this month, two warehousing firms released dramatically different financial results in a 24-hour period. Arbor reported huge increases for its second quarter ended Sept. 30, with revenue up 101%, to \$10.8 million and net income up 300%, to \$1.4 million.

Meanwhile, Prism Solutions, Inc., which provides data management and administration tools, reported revenue was up 25%, to \$6 million for its third quarter ended Sept. 30, but new software license revenue was down. It also had a net loss of \$1.6 million and noted that it had "hoped to do better in the quarter."

In addition, some analysts think warehousing stocks have been pricey this year, in part because of all the market hype.

"They got too richly valued back in the spring," says David Thomas, an analyst at First Albany Corp. "Look to see the prices fall some [because] they are

still a little bit too expensive."

· Wait for what could be the big bonanza. For investors interested in initial public offerings (IPO), some analysts expect several more small warehousing companies - perhaps as many as a dozen, depending on market conditions to go public between now and early

Investors should track some of the hotter players, particularly those specializing in data administration - which includes such functions as data extraction, transformation and cleansing - or data access. Two of the many companies to watch in that space are Vality Technology, Inc. in Boston and Brio Technology, Inc. in Palo Alto, Calif. Vality provides a set of tools to re-engineer corporate data for use in a warehouse. and Brio sells query tools.

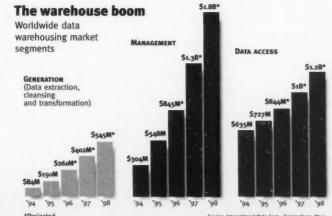
In a prepared statement, Mark Atkins, Vality's president, confirmed that the company is considering a public offering in "the near term." Brio declined to comment on any specific IPO plans.

Some analysts say the best technique is to meld these three investment approaches and come up with a wellrounded warehousing portfolio.

"I would advise [investors] to pick a mix of aggressive plays and conservative plays and then pay attention to these new ones that will be going public," Thomas said.

But the key, analysts say, is to make sure investments are made in firms that show clear signs of addressing emerging user concerns. Just one example: Most user companies are focusing on small warehouses, or data marts, because big corporate warehouses are too expensive and take too long to develop.

Therefore, it is likely best to avoid a company that continues to sell exclusively enterprisewide warehousing. And, as always, sidestep companies that appear to be just one-trick ponies, analysts say.



The New IT Blueprint for a Changing World

Client/Server Application Management
Electronic Software Distribution
Intranet and Internet Service Management
Integrated Network/Systems Management
Integrated Network/Systems Management
Infrastructure Configuration Management

OKIMARE MANAGEMEN

Seminar Schedule

	No.		
Atlanta	November 7	Montreal	November 5
Baltimore	November 13	Nashville	October 29
Boston	October 29	New York	October 31
Calgary	November 12	Orange County, C	AOctober 16
Charlotte	November 5	Orlando	October 30
Chicago	October 22	Philadelphia	November 12
Cleveland	November 6	Phoenix	November 19
Columbus	November 7	Portland	October 16
Dallas	October 24	Salt Lake City	November 13
Denver	November 14	San Diego	October 15
Detroit	October 24	San Francisco	October 17
Houston	October 23	Schaumburg, IL	November 8
Kansas City, MO	November 20	Seattle	October 17
Los Angeles	October 15	Stamford	October 22
Miami	November 6	Toronto	October 30
Minneapolis	October 23	Washington, D.C.	November 14

SEE A DEMONSTRATION OF EDM'S WINDOWS NT VERSION.

NOVADIEM

Attend the Only Seminar Focused Exclusively on Distributed Software Management

If your organization is deploying new client/server or Internet software, this is one seminar you can't afford to miss. And it's free.

Plan to attend a half-day presentation from the industry leader in software management, Novadigm, and learn how you can eliminate the most time-consuming, error-prone, and costly task in your IT management environment—managing distributed software.

At this seminar, you'll see first hand how Novadigm's new patented 'desiredstate' software management technologies enable organizations just like yours to control distributed software's 'millions of moving parts,' automatically:

- Configuring rapidly changing client/server applications across thousands of desktops and servers—without manual intervention.
- Securing and enabling new intranet and Internet services for distributed employees, partners, and customers—reliably.
- Distributing shrink-wrap, operating system, and browser upgrades—'ondemand.'
- Integrating software management and network/systems management infrastructures—seamlessly.

This special invitation from Novadigm includes a sneak preview of a new release of its industry-standard EDM™ environment. It's a breakthrough that any IT professional would want to see ... and a must-attend event.

Register NOW. Call toll free 888.668.NOVA (6682) or visit www.novadigm.com.

14.13 15.50 18.25 24.75 46.50 6.88 72.25 23.75 1.19 25.75 11.33 31.13 18.75 17.75 11.13 43.00 8.88 28.13 2.94 9.50 13.88 13.25 21.50 -0.63 -0.88 -0.89 -0.25 -0.25 -1.25 -0.06 -2.25 -0.50 -1.13 -1.50 -0.25 -1.50 -1.25 -0.13 -1.25 -0.13 -1.25 -0.13 -1.25 -0.13 -1.25 -0.25 -1.25 -0.25 -1.25 4.2 5.3 0.0 1.0 1.6 5.1 5.0 9.6 4.2 3.3 5.7 7.7 8.8 2.3 3.4 2.6 5.4 2.3 3.4 2.6 5.4 2.3

1.00 1.88 -2.25 0.00 -1.75 -2.25 1.00 0.00 -0.75 -0.56 0.75 3.00 -5.38 -1.13

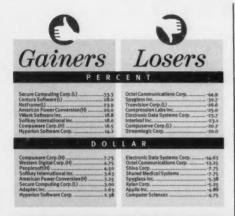
0.13 -1.00 0.13 -0.50 -0.63 -2.38 -0.38 -0.36 -0.25 -3.63 -1.00 -0.63 -3.13 0.00 -1.00 -2.00 0.7 -3.6 0.7 -2.4 -5.4 -3.2 -1.2 -1.2 -1.3 -2.1 -3.2 -5.8 0.0 -2.9 -9.2

32.13 24.75 41.38 49.75 27.88 49.75 27.88 75.38 22.50 47.00 37.13 9.00 46.25 17.88 57.75 32.50 20.13 20.13 20.13 27.75 27.00 27.75 27.00 27.75 27.88 27.75 27.88 27.75 27.75 27.70 27.75 27.88 0.38 0.00 0.75 -2.00 -2.38 -2.50 0.88 0.38 -4.75 -3.25 -3.38 -0.50 -1.00 0.25 -0.25 -0.25 -0.25 -1.00 -1.77 -1.00 -1.77 -1.00 -1.77 -1.00 -1.77

The Week in Stocks

EXCH 52-WEEK RANGE

13.00 67.00 81.75 40.63 60.50 25.25 16.25 36.75 20.13 12.63 18.00 89.25 22.25 22.25 22.75 9.25 22.88 21.25 18.63 139.13 46.38 54.50 20.38 13.50 3.25 20.00 24.75 5.63 23.00 9.75 10.00 16.88 8.63 2.00 7.50 25.88 5.38 7.50 3.25 14.00 8.88 8.25 5.63 79.88 26.38 25.88 26.38 25.88 26.38 27.88 26.38 27.88 26.38 27.88 26.38 27.88



Industry Almanac

Vantive heads off sell-off

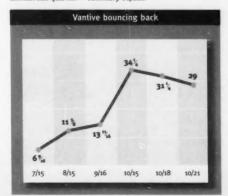
Sometimes good financial performance isn't enough to keep a company's stock from taking a beating.

Vantive Corp., a manufacturer of information management and help desk software, is a case in point. The company has been steamrolling along since it went public last year, with revenue growth rates at about 150%. Vantive earlier this month reported third-quarter results that showed revenue of \$17.2 million - a 161% increase compared with the same quarter last year. Net income was \$3.1 million, up from \$632,000 in the same period last year.

So how did Vantive upset investors so much that its stock plunged 23% to \$31.25 in only one day? Following its earnings announcement, Vantive alerted Wall Street not to expect such great growth rates for the next two quarters. Stockholders didn't take kindly to the news, and a rapid sell-off of Vantive stock was under way.

Wall Street analysts say that although stockholders clearly overreacted, there is some underlying cause for concern. Analysts worry that Vantive may have been too slow in ramping up its sales force to maintain its rapid growth. In Vantive's highly competitive market, that could become a serious problem; its sales cycles are long, and salespeople need lots of expertise.

In response, Vantive last week said it had recently increased its sales force by one-third and plans to boost it by the same amount this quarter. - Rosemary Cafasso



Demanda of	may need	Period Services	1	OFF	016	PRGS	18.75	9.25	PLATINUM TECHNOLOGY
COM5 68.50	33.50	25045	(2.50	0.25	A C	PRGS	38.00 25.50	12.13 14.63	PROGRESS SOFTWARE CORP. RAINBOW TECHNOLOGIES INC.
85.3a TIA	49.63	3 COM CORP. AMERITECH CORP.	62.50 56.00	-0.75	-1.2	REDB	61.00	18.25	
T 68.88	36.13	AT&T	36.13	-3.75	-9.4	SAPE	58.25	29.25	SAPIENT CORP. SCO INC. SECURITY DYNAMICS TECH. SOFTKEY INTERNATIONAL INC.
ASNI 71.25	36.13 26.63	ASCEND COMMUNICATIONS	36.13	·3.75 ·3.38	-9.4	SCOC	9.13	5.50 27.25	SCOINC.
	4.50	BANYAN SYSTEMS INC. BAY NETWORKS INC. (L) BELL ATLANTIC CORP.	4.88	-0.38	-7.1	SKEY	40.75	13.38	SOFTHEY INTERNATIONAL INC
BAY 50.00 BEL 80.38	18.63 43.50	BAY NETWORKS INC. (L)	19.88	0.13	0.6		4.25	1.19	
BLS 45.88		BELLSOUTH CORP.	38.88	-1.13	-2.8	SQAX	39.75	16.00	SQAINC. STATE OF THE ART
BLS 45.88 BRKT 42.25	8.13	BELLSOUTH CORP. BROOKTROUT TECHNOLOGY	35.00	-1.13 -0.50		SOTA	19.75	0.10	STATE OF THE ART
C5 87.75		CABLETRON SYSTEMS CASCADE COMMUNICATIONS CENTIGRAM COMMUNICATIONS	60.00	-2.00	-1.4	SSW	81.38 37.38	28.25	STERLING SOFTWARE INC. STRUCT. DYNAMICS RESEARCH
CSCC 91.25	19.38	CASCADE COMMUNICATIONS	73.25 13.13	0.13	0.2	SYBS	39.75	13.50	STRUCT, DYNAMICS RESEARCH
CGRM 24.13 CSCO 67.00	32.00	CENTIGRAM COMMUNICATIONS	60.00	-1.50	10.3	SYMC	30.38	8.75	SYBASEINC. SYMANTEC CORP.
CLIX 9.25	4.50	CISCO SYSTEMS INC. COMPRESSION LABS INC.	4.50	-1.50	-5.3 -25.0	SNPS	50.50	27.50 8.25	SYMMATEC. CORP. SYNDPSYS SYSTEM SOFTWARE ASSOC. SYSTEMSOFT CORP. TRUEVISION CORP. (L) VIEWLOGIC SYSTEMS (L) VMARK SOFTWARE INC. WALKER INTERACTIVE SYSTEMS. WALL DATA INC.
CMNT 10.50	4.00		5.44	-0.56	-9.4	SSAX	28.38		SYSTEM SOFTWARE ASSOC.
XCOM 14.25 DIGI 43.25	4.75	CROSSCOMM DSC COMMUNICATIONS (L)	5.38	-0.25	-9.4 -4.4	SYSF	36.50	4.38	SYSTEMSOFT CORP.
DIGI 43.25		DSC COMMUNICATIONS (L)		-1.63		VIEW	9.63 17.50	2.75 8.38	View Look Evereus (1)
FORE 44.75 GDC 21.88	18.75	FORE SYSTEMS INC. GENERAL DATACOMM INDS. GENERAL SIGNAL NETWORKS GTE CORP.	39.75	0.50	1.3	VMRK	12.63	5.50	VMARY SOCTWARE INC
GSX 44.25	30.50	GENERAL DATACOMM INDS.	10.25	-0.63 0.38	0.9	WALK	15.38 27.50	6.25	WALKER INTERACTIVE SYSTEMS
GTE 49.25	37.75	GTF CORP	42.38	0.38	0.6	WALL	27.50	12.25	
LU 48.88	29.75	LUCENT TECH. (H)	48.88	1.50	3.2	WANG	26.13	15.38	WANG LABORATORIES INC.
MADGF 48.63	0.88	GTE CORP. LUCENT TECH. (H) MADGE NETWORKS NV (L) MCI COMMMUNICATIONS CORP.	9.00	-1.00	-10.0	-	-	-	
	22.38	MCI COMMMUNICATIONS CORP.	25.38	0.94	3.8	160	OR.		
MNPI 34.50 NETM 34.00	5.50	MCI COMMMUNICATIONS CORP. MICROCOM INC. NETMANAGE INC. (L) NETRIX CORP. NETWORK COMPUTING DEVICES NETWORK COMPUTING DEVICES NETWORK EQUIPMENT TECH. NETWORK GENERAL NEWBRIDGE NETWORKS CORP. NEWBRIDGE NETWORKS CORP. NEWBRIDGE NETWORKS CORP.	8.66	-0.13	-1.4	AOL	71.00	22.38	AMERICA ON-LINE
NETM 34.00 NTRX 10.88	6.44 3.75 2.88	NETMANAGE INC. (L)	6.69	0.44	6.1	BBN	48.75	15.63	BBN CORP. COMPUSERVE CORP. (L)
NCDI 10.25	2.88	NETWORK COMPUTING DEVICES	7.19	0.06	3.8	CSRV	35.50	8.63	COMPUSERVE CORP. (L)
NWK 36.00	11.13	NETWORK EQUIPMENT TECH.	13.88	-1.75	-11.2	EDFY LCOS	55.75 29.25	15.50	EDIFY CORP.
NETG 27.63	11.13 15.00 13.88	NETWORK GENERAL	24.38	-1.19	-4.6	NETC	29.25	13.25	COMPUSERVE CORP. (L) EDIFY CORP. LYCOS INC. NETCOM ON-LINE (L) NETSCAPE COMM. CORP. OPEN MARKET INC. PSINET QUARTERDECK CORP. RANCOS ENTERME.
NN 37.25	13.88	NEWBRIDGE NETWORKS CORP.	29.25	-ii.63	-13.7	NSCP	91.50 87.00	34.25	NETCOM ON-LINE (L)
NT 64.75 NOVL 19.13	31.50 9.88	MONTHERN TELECOMICTO. (II)	61.75	1.38	2.3		42.25	11.50	OPEN MARKET INC.
NVN 50.75	47.00	Nyuer Coss	44.13	0.13	0.3	PSIX	29.00	6.75	PSINET
MYN 59.25 OCTL 31.75	42.00	OCTEL COMMUNICATIONS CORP.	44.13	-13.25	-44.9	QDEK	39.50	5.56	QUARTERDECK CORP.
	13.00	NYNEX CORP. OCTEL COMMUNICATIONS CORP. OPTICAL DATA SYSTEMS INC. (L) PACIFIC FLEESIS PICTURETEL CORP.	15.63 34.88 29.50	1.63	11.6	RAPT	39.25	12.75	RAPTOR SYSTEMS SECURE COMPUTING CORP. (L)
PAC 35.25 PCTL 44.72	25.88	PACIFIC TELESIS	34.88	-0.13	-0.4	SCUR	64.50	9.00	SECURE COMPUTING CORP. (L)
PCTL 44.72	26.75	PICTURETEL CORP.	29.50	-4.38	-12.9	AHOO	61.00	15.50	SPYGLASS INC. YAHOO! INC.
PTON 9.00	2.38	PROTEON INC. RACOTEK INC.	2.88	0.13	4.5	THOU	43.00	15.50	TANOD! INC.
RACO 7.00 RETX 10.88	3.50	RACOTEK INC.	5.00	-0.44	-8.0		1000		
RETX 10.88 SBC 60.25	1.81	RETIX SBC COMMUNICATIONS SCIENTIFIC ATLANTA INC. SHIVA CORP.	5.88	-1.00	-14.5	300	or interes	100	which the second has
SFA 20.38	11.38	SCIENTIFIC ATLANTA INC.	14.63	-1.88	-11.4	AMID	28.50	10.25	ADVANCED MICRO DEVICES
SHVA 87.25	25.13	SHIVA CORP.	38.25	-7.75	-16.8	CHPS	30.13 21.38 50.13	17.00	ANALOG DEVICES INC. CHIPS AND TECHNOLOGIES (H) CIRRUS LOGIC
FON AS SO	29.25		38 38	.0.38	-1.0	CRUS	21.38	12.63	CHIPS AND TECHNOLOGIES (M)
SMSC 23.50 TBIT 13.88	10.25	STANDARD MICROSYSTEMS CORP. TELEBIT CORP.	12.50	-0.50	-3.8	CKUS	19.13	0.13	
TBIT 13.88 USRX 105.50	2.38	TELEBIT CORP.	13.25	0.00	0.0	CYRX	41.88	9.13 11.50	CASIX
USRX 105.50 USW 48.38	32.75 27.25	US ROBOTICS US WEST INC.	70.13	-4.38 -0.88	-5.9 -2.8	INTC	114,13		CYRIX INTEL CORP.
XIRC 21.75	8.88	XIRCOM (H)	20.75	0.38	1.8	LSI	50.50	17.00	LSI LOGIC CORP. LATTICE SEMICONDUCTOR
XIRC 21.75 XYLN 76.00	34.00	XIRCOM (H) XYLAN CORP.	20.75	0.38	-10.9	LSCC	40.25	19.75	LATTICE SEMICONDUCTOR
-	-		-	-	-	MCRL MU	25.50 74.63	12.00 16.63	MICREL SEMICONDUCTOR INC. MICRON TECHNOLOGY
PCs and Worl	the ballion	THE STATE OF STREET		OFF	.60%	MOT	69.63	10.03	MOTOROUA INC
The second second second	0.00	Assessment Lance December	0.50	0.63	Name and Address of	NSM	68.63 27.25	44.75 13.00	MOTOROLA INC. NATIONAL SEMICONDUCTOR
AALR 10.38 AAPL 42.50	5.88 16.00	ADVANCED LOGIC RESEARCH APPLE COMPUTER INC. AST RESEARCH INC. COMPAQ COMPUTER CORP.	9.50 24.79 4.50 71.00	0.63	7.0	TXN	72.00		TEXAS INSTRUMENTS
AAPL 42.50 ASTA 10.25 CPQ 75.38 DELL 88.75	4.00	AST RESEARCH INC.	4.50	-1.75	-6.6	VLSI	26.63	10.38	VLSI TECHNOLOGY
CPQ 75.38	35.88	COMPAQ COMPUTER CORP.	71.00	-1.38	-1.9	XLNX	49.00	23.25	XILINX
	23.00	DELL COMPUTER CORP.	83.00 51.25		-0.6	ZLG	40.38	14.88	ZILOG INC.
GATE 57.63	18.00								
HWD 67.76		Heuners Backage Co	45.61	-3.63	-6.6	1190	Andrews &c		American Committee Committ
HWP 57.75	36.88	DELL COMPUTER CORP. GATEWAY 2000 INC. HEWLETT PACKARD CO. MICRON INTERNATIONAL INC.	45.6	1.88	-3.9	Per		and Sul	
MUEI 23.50 NIPNY 69.88	36.88 8.75 49.88	MICRON INTERNATIONAL INC.	45.63 18.25 54.00	3 -1.88 5 -2.00 1 -3.00	-3.9 -9.9 -5.3	ARCC		7.88	AMERICAN POWER CONVERSION
MUEI 23.50 NIPNY 69.88	36.88 8.75 49.88	MICRON INTERNATIONAL INC.	45.63 18.25 54.00	3 -1.88 5 -2.00 1 -3.00	-3.9 -9.9 -5.3	ARCC		7.88 35.00	AMERICAN POWER CONVERSION
MUEI 23.50	36.88	HEWLETT PACKARD CO. MICROW INTERNATIONAL INC. NEC AMERICA SILICON GRAPHICS (L) SUN MICROSYSTEMS INC.	45.63	3 -1.88 5 -2.00 1 -3.00	-3.9	APCC ADPT CBEX	19.50 65.75 10.63	7.88 35.00	AMERICAN POWER CONVERSION ADAPTEC INC. CAMBER CORP.
MUEI 23.50 NIPNY 69.88 SGI 38.75 SUNW 70.25	36.88 8.75 49.88	MICRON INTERNATIONAL INC.	45.63 18.25 54.00	3 -1.88 5 -2.00 0 -3.00 0 -1.00 3 -1.00	-3.9 -9.9 -5.3 -4.9 -1.7	APCC ADPT CBEX CREAL	19.50 65.75 10.63	7.88 35.00	AMERICAN POWER CONVERSION ADAPTEC INC. CAMBEX CORP. CREATIVE TECHNOLOGY LTD.
MUEI 23.50 NIPNY 69.88 SGI 38.75 SUNW 70.25	36.88 8.75 49.88	MICRON INTERNATIONAL INC.	45.63 18.25 54.00	3 -1.88 5 -2.00 1 -3.00	-3.9 -9.9 -5.3 -4.9 -1.7	APCC ADPT CBEX	19.50 65.75 10.63	7.88 35.00 3.00 3.50 3.63	AMERICAN POWER CONVERSION ADAPTEC INC. CAMBEX CORP. CREATIVE TECHNOLOGY LTD.
MUEI 23.50 NIPNY 69.88 SGI 38.75 SUNW 70.25	36.88 8.75 49.88 19.50 34.75	MICRON INTERNATIONAL INC. NEC AMERICA SILICON GRAPHICS (L) SUN MICROSYSTEMS INC.	45.6: 18.2: 54.00 19.50 59.38	3 -1.88 5 -2.00 0 -3.00 0 -1.00 3 -1.00	-3.9 -9.9 -5.3 -4.9 -1.7	APCC ADPT CBEX CREAL RACE DTM EMC	19.50 65.75 10.63 F 12.25 12.75 8.88 27.75	7.88 35.00 3.00 3.50 3.63 4.13	AMERICAN POWER CONVERSION ADAPTEC INC. CAMBEX CORP. CREATIVE TECHNOLOGY LTD.
MUEI 23.50 NIPNY 69.88 SGI 38.75 SUNW 70.25	36.88 8.75 49.88 19.50 34.75	MICRON INTERNATIONAL INC. NEC AMBRICA SILICON GRAPHICS (L) SUN MICROSYSTEMS INC. AMDAHL CORP. DATA GENERAL CORP.	45.61 18.25 54.00 19.50 59.38	3 -1.88 5 -2.00 0 -3.00 0 -1.00 3 -1.00	-3.9 -9.9 -5.3 -4.9 -1.7	APCC ADPT CBEX CREAL RACE DTM EMC EMCX	19.50 65.75 10.63 F 12.25 12.75 8.88 27.75 21.38	7.88 35.00 3.00 3.50 3.63 4.13	AMERICAN POWER CONVERSION ADAPTEC INC. CAMBEX CORP. CREATIVE TECHNOLOGY LTD.
MUEI 23.50 NIPNY 69.88 SGI 38.75 SUNW 70.25	36.88 8.75 49.88 19.50 34.75	MICRON INTERNATIONAL INC. NEC AMBRICA SILICON GRAPHICS (L) SUN MICROSYSTEMS INC. AMDAHL CORP. DATA GENERAL CORP.	45.61 18.25 54.00 19.50 59.38	3 -1.88 5 -2.00 0 -3.00 0 -1.00 3 -1.00	-3.9 -9.9 -5.3 -4.9 -1.7 -0.0 -6.6 -13.1	APCC ADPT CBEX CREA! RACE DTM EMC EMLX ESCC	19.50 65.75 10.63 F 12.25 12.75 8.88 27.75 21.38 29.00	7.88 35.00 3.00 3.50 3.63 4.13 13.25 6.38 19.00	AMERICAN POWER CONVERSION ADAPTEC INC. CAMBEX CORP. CREATIVE TECHNOLOGY LTD. DATA RACE INC. DATABAN CORP. EMC CORP. (H) EMULEX CORP. EVANS AND SUTHERLAND
MUEI 23.50 NIPNY 59.88 SGI 38.75 SUNW 70.25 AMH 13.50 DGC 19.13 DEC 76.50 IBM 135.38	36.88 8.75 49.88 19.50 34.75 6.75 9.00 28.38 83.13	MICRON INTERNATIONAL INC. NEC AMERICA SILICON GRAPHICS (L) SUN MICROSYSTEMS INC. AMDAHL CORP. DATA GENERAL CORP. DIGITAL EQUIPMENT CORP. (L)	45.61 18.25 54.00 19.50 59.38	3 -1.88 5 -2.00 0 -3.00 0 -1.00 3 -1.00	-3.9 -9.9 -5.3 -4.9 -1.7 -0.0 -6.6 -13.1	APCC ADPT CBEX CREAI RACE DTM EMC EMCX ESCC EMLX ESCC EXBT	19.50 65.75 10.63 F 12.25 12.75 8.88 27.75 21.38 29.00 22.75	7.88 35.00 3.00 3.50 3.63 4.13 13.25 6.38 19.00	AMERICAN POWER CONVERSION ADAPTEC INC. CAMBEX CORP. CREATIVE TECHNOLOGY LTD. DATA RACE INC. DATARMO CORP. EMC CORP. (H) EAULEX CORP. EVANS AND SUTHERLAND
MUEI 23.50 NIPNY 69.88 SGI 38.75 SUNW 70.25 AMH 13.50 DGN 19.13 DEC 76.50 IBM 135.38 MDCD 20.25	36.88 8.75 49.88 19.50 34.75 6.75 9.00 28.38 83.13	MICRON INTERNATIONAL INC. NEC AMERICA SILICON GRAPHICS (L) SUN MICROSYSTEMS INC. AMDAHL CORP. DATA GENERAL CORP. DIGITAL EQUIPMENT CORP. (L)	45.61 18.25 54.00 19.50 59.38	3 -1.88 5 -2.00 0 -3.00 0 -1.00 3 -1.00	-3.9 -9.9 -5.3 -4.9 -1.7 -0.0 -6.6 -13.1	APCC ADPT CBEX CREAI RACE DTM EMC EMLX ESCC EXBT	19.50 65.75 10.63 F 12.25 12.75 8.88 27.75 21.38 29.00 22.75	7.88 35.00 3.00 3.50 3.63 4.13 13.25 6.38 19.00 11.38	AMERICAN POWER CONVERSION ADAPTEC INC. CAMBEX CORP. CREATIVE TECHNOLOGY LTD. DATA RACE INC. DATARMO CORP. EMC CORP. (H) EAULEX CORP. EVANS AND SUTHERLAND
MUEI 23.50 NIPNY 69.88 SGI 38.75 SUNW 70.25 AMH 13.50 DGN 19.13 DEC 76.50 IBM 135.38 MDCD 20.25 NETF 6.50	36.88 8.75 49.88 19.50 34.75 6.75 9.00 28.38 83.13 6.50 2.38	MICRON INTERNATIONAL INC. NEC AMERICA SILICON GRAPHICS (L) SUN MICROSYSTEMS INC. AMDAHL CORP. DATA GENERAL CORP. DIGITAL EQUIPMENT CORP. (L)	9.94 14.25 29.77 127.77 127.77	0.00 0.100 0.100 0.100 0.00 0.100 0.00 0.100 0.00 0.100 0.00	-3.9 -9.9 -5.3 -4.9 -1.7 -0.0 -6.6 -13.1 0.4 5.1 23.9	APCC ADPT CBEX CREAI RACE DTM EMC EMLX ESCC EXBT IISLF IOMG IPLS	19.50 65.75 10.63 F 12.25 12.75 8.88 27.75 21.38 29.00 22.75 4.13 55.13 8.26	7.88 35.00 3.00 3.50 3.63 4.13 13.25 6.38 19.00 11.38 1.44 3.75	AMERICAN POWER CONVERSION ADAPTEC INC. CAMBEX CORP. CREATIVE TECHNOLOGY LTD. DATA RACE INC. DATARMO CORP. EMC CORP. (H) EAULEX CORP. EVANS AND SUTHERLAND
MUEI 23.50 NIPNY 69.88 SGI 38.75 SUNW 70.25 AMH 13.50 DGN 19.13 DEC 76.50 IBM 135.38 MDC 20.25 NETF 6.50 SQNT 19.13 SEOS 7.38	36.88 8.75 49.88 19.50 34.75 6.75 9.00 28.38 83.13 6.50 2.38 10.13 1.88	MICRON INTERNATIONAL INC. NEC AMERICA SILICON GRAPHICS (L) SUN MICROSYSTEMS INC. AMDAHL CORP. DATA GENERAL CORP. DIGITAL EQUIPMENT CORP. (L)	9.94 14.22 59.36 9.94 14.22 29.71 127.77 7.77 3.55	3 -1.88 5 -2.00 0 -3.00 0 -1.00 8 -1.00 0 -4.50 5 -4.50 5 -0.50 5 -0.50 5 -0.50 5 -0.50	-3.9 -9.9 -5.3 -4.9 -1.7 -0.0 -6.6 -13.1 0.4 5.1 23.9 6.3	APCC ADPT CBEX CREAI RACE DTM EMC EMLX ESCC EXBT IISLF IOMG IPLS KMAG	19.50 65.75 10.63 F 12.25 12.75 8.88 27.75 21.38 29.00 22.75 4.13 55.13 8.25 37.00	7,88 35,00 3,50 3,50 3,63 4,13 13,25 6,38 19,00 11,38 1,44 3,75 1,63	AMERICAN POWER CONVERSION ADAPTEC INC. CAMBEX CORP. CREATVE TECHNOLOGY LTD. DATA RACE HIS. DATA CAMBON HIS. SYSTEMS IDAEGA CORP. PL. SYSTEMS INC. (L)
MUEI 23.50 NIPNY 69.88 SGI 38.75 SUNW 70.25 AMH 13.50 DGN 19.13 DEC 76.50 IBM 135.38 MDCD 20.25 NETF 6.50 SQNT 19.13 SEQS 7.38 SPA 36.13	36.88 8.75 49.88 19.50 34.75 6.75 9.00 28.38 83.13 6.50 2.38 10.13 1.88	MICRON INTERNATIONAL INC. NEC AMERICA SILICOM GRAPHICS (L) AMDAHL CORP. DIGTAL EQUIPMENT CORP. (L) IBMA (H) MERIDAN DATA INC. NETFAME (L) SEQUENT COMPUTER SYS. SEQUEN SYSTEMS INC.	9.94 14.25 59.36 9.94 14.22 29.77 127.77 7.77 3.56 14.88 2.56 23.66	3 -1.88 5 -2.00 0 -3.00 0 -1.00 8 -1.00 6 -4.50 5 -4.50 5 -4.50 6 0.69 8 0.69 8 0.69	-3.9 -9.9 -5.3 -4.9 -1.7 -0.0 -6.6 -13.1 0.4 -5.1 23.9 -6.3 -4.8	APCC ADPT CBEX CREAI RACE DTM EMC EMC ESCC EXBT IISLF IOMG IPLS KMAGG MTSI	19.50 65.75 10.63 F 12.25 12.75 8.88 27.75 21.38 29.00 22.75 4.13 55.13 8.35 37.00 22.25	7.88 35.00 3.00 3.50 3.63 4.13 13.25 6.38 19.00 11.38 1.44 3.75 1.63 17.63 11.25	AMERICAN POWER CONVERSION ADAPTEC INC. CAMBEX CORP. CREATVE TECHNOLOGY LTD. DATA RACE HIS. DATA CAMBON HIS. SYSTEMS IDAEGA CORP. PL. SYSTEMS INC. (L)
MUEI 23.50 NIPNY 69.88 SGI 38.75 SUNW 70.25 AMH 13.50 DGN 19.13 DEC 76.50 IBM 135.38 MDCD 20.25 NETF 6.50 SQNT 19.13 SEQS 7.38 SPA 36.13	36.88 8.75 49.88 19.50 34.75 6.75 9.00 28.38 83.13 6.50 2.38 10.13 1.88	MICRON INTERNATIONAL INC. NEC AMERICA SILICOM GRAPHICS (L) AMDAHL CORP. DIGTAL EQUIPMENT CORP. (L) IBMA (H) MERIDAN DATA INC. NETFAME (L) SEQUENT COMPUTER SYS. SEQUEN SYSTEMS INC.	9.94 14.25 59.36 9.94 14.22 29.77 127.77 7.77 3.56 14.88 2.56 23.66	3 -1.88 5 -2.00 0 -3.00 0 -1.00 8 -1.00 6 -4.50 5 -4.50 5 -4.50 6 0.69 8 0.69 8 0.69	-3.9 -9.9 -5.3 -4.9 -1.7 -0.0 -6.6 -13.1 0.4 -5.1 23.9 -6.3 -4.8	APCC ADPT CBEX CREA! RACE DTM EMC EMCX ESCC EXBT IISLF IOMG IPLS KMAG MTSI PEAK	19.50 65.75 10.63 F 12.25 12.75 8.88 27.75 21.38 29.00 22.75 4.13 55.13 8.25 37.00 22.25 34.75	7.88 35.00 3.60 3.63 4.13 13.25 6.38 19.00 11.38 1.44 3.75 1.63 11.25	AMERICAN POWER CONVERSION ADAPTEC INC. CAMBEX CORP. CREATVE TECHNOLOGY LTD. DATA RACE HIS. DATA CAMBON HIS. SYSTEMS IDAEGA CORP. PL. SYSTEMS INC. (L)
MUEI 23.50 NIPNY 69.88 SGI 38.75 SUNW 70.25 AMH 13.50 DGN 19.13 DEC 76.50 IEM 135.38 MDCD 20.25 NETF 6.50 SQNT 19.13 SEQS 7.38 SRA 36.13	36.88 8.75 49.88 19.50 34.75 6.75 9.00 28.38 83.13 6.50 2.38 10.13 1.88	MICRON INTERNATIONAL INC. NEC AMERICA SILICON GRAPHICS (L) SUN MICROSYSTEMS INC. AMDAHL CORP. DATA GENERAL CORP. DIGITAL EQUIPMENT CORP. (L)	9.94 14.20 9.94 14.22 9.94 14.22 9.77 7.77 3.55 14.80	3 -1.88 5 -2.00 0 -3.00 0 -1.00 8 -1.00 6 -4.50 5 -4.50 5 -4.50 6 0.69 8 0.69 8 0.69	-3.9 -9.9 -5.3 -4.9 -1.7 -0.0 -6.6 -13.1 0.4 5.1 23.9 6.3 -4.8	APCC ADPT CBEX CREAI RACE DTM EMC EMLX ESCC EXBT IISLF IOMG IPLS KMAG MTSI PEAK	19.50 65.75 10.63 F 12.25 12.75 8.88 27.75 21.38 29.00 22.75 4.13 55.13 5.13 5.13 5.13 5.13 5.13	7.88 35.00 3.00 3.63 4.13 13.25 6.38 19.00 11.38 1.44 3.75 1.63 17.63 11.25	AMERICAN POWER CONVERSION ADAPTICS INC. CAMBER CORP. CAMBER CORP. DATA RACE INC. BENUTE CORP. EMULEK
MUEI 23.50 NIPNY 69.88 SGI 38.75 SUNW 70.25 AMH 13.50 DGN 19.13 DEC 76.50 IBM 135.38 MDCD 20.25 NETF 6.50 SQNT 19.13 SEQS 7.38 SPA 36.13	36.88 8.75 49.88 19.50 34.75 6.75 9.00 28.38 83.13 6.50 2.38 10.13 1.88	MICRON INTERNATIONAL INC. NEC AMERICA SILICOM GRAPHICS (L) AMDAHL CORP. DIGTAL EQUIPMENT CORP. (L) IBMA (H) MERIDAN DATA INC. NETFAME (L) SEQUENT COMPUTER SYS. SEQUEN SYSTEMS INC.	9.94 14.25 59.36 9.94 14.22 29.77 127.77 7.77 3.56 14.88 2.56 23.66	3 -1.88 3 -2.00 3 -3.00 3 -1.00 3 -1.00 6 -1.00 5 -4.50 6 -0.50 6 0.38 6 0.88 7 -0.13 8 -1.00 9 -0.13 9 -0.13 9 -0.13 9 -0.13 9 -0.13	0.0 6.6 13.1 0.4 5.1 23.9 6.3 4.8 4.1 4.2	APCC ADPT CBEX CREAI RACE DTM EMC EMLX ESCC EXBLT JISLF IOMG IPLS KMAG MTSI PEAK PNCL AQM QNTM	19.50 65.75 10.63 F 12.25 12.75 8.88 27.75 21.38 29.00 22.75 4.13 55.13 8.25 37.00 22.25 34.75 19.75 6.75 20	7.88 35.00 3.50 3.63 4.13 13.25 6.38 19.00 11.38 1.44 3.75 1.63 17.63 11.28 4.88 3.25	AMERICAN POWER CONVERSION DATE TO THE COMMITTED TO THE CO
MUEL 23.5.0 MIPNY 62.5.0 MIPNY 70.25 SUNW 70.25 AMH 13.50 DGN 19.13 DEC 76.50 IBM 135.38 MDCD 20.25 NETF 6.50 SQNT 19.13 SQQ 7.38 SRA 36.13 TOM 15.25 UIS 9.13	36.88 8.75 49.88 19.50 34.75 6.75 9.00 28.38 83.13 6.50 2.38 10.13 1.88 16.63 8.38 5.38	MICROW INTERNATIONAL INC. NEC AMERICA. SUR MICROSYSTEMS INC. AMDANL CORP. DATA GENERAL CORP. DISTAL EQUIPMENT CORP. (L) BM (M). MODITAL EQUIPMENT CORP. (L) SQUENT COMPUTER SYS.	9.9.1 14.2 19.5 19.5 19.5 14.2 29.7 127.7 7.7 3.5 14.8 2.5 6.3	3 -1.88 5 -2.00 1 -3.00 1 -1.00 6 -1.00 6 -4.50 5 -4.50 6 -4.50 6 -0.13 6 -0.50 8 -1.00 6 -0.50 8 -1.00 6 -0.50 6 -0.50 7 -0.50 8 -1.00	-3.9 -9.9 -5.3 -4.9 -1.7 -6.0 -6.13.1 0.4 5.1 23.9 6.3 -4.8 -4.1 4.2 -12.1	APCC ADPT CBEX CREAI RACE DTM EMC EMC EMC EXBT IISLF IOMG IPLS KMAG MTSI PEAK PNCL AQM	19.50 65.75 10.63 F 12.25 12.75 8.88 27.75 21.38 29.00 22.75 4.13 55.13 55.13 57.00 22.25 34.75 19.75 6.75 4.88	7.88 35.00 3.00 3.50 3.63 4.13 13.25 6.38 19.00 11.38 1.44 3.75 1.63 17.63 11.28 4.88 3.25 10.81	AMERICAN POWER CONVERSION DATE TO THE COMMITTED TO THE CO
MUEL 23.50 MIPNY 62.13 SGI 38.75 SUNW 70.25 AMH 13.50 DGN 19.13 DEC 76.00 BMD 12.13 DEC 76.50 BMM 135.38 MDCD 20.25 NETF 6.50 SQNT 19.13 SEQS 7.38 SRA 36.13 TDM 15.25 UIS 9.13	36.88 8.75 49.88 19.50 34.75 6.75 9.00 28.38 83.13 6.50 2.38 10.13 1.88 16.63 8.38 5.36	MICROW INTERNATIONAL INC. NEC AMERICA. SUR MICROSYSTEMS INC. AMDANL CORP. DATA GENERAL CORP. DISTAL EQUIPMENT CORP. (L) BM (M). MODITAL EQUIPMENT CORP. (L) SQUENT COMPUTER SYS.	9.9.1 14.2 19.5 19.5 19.5 14.2 29.7 127.7 7.7 3.5 14.8 2.5 6.3	3 -1.88 5 -2.00 1 -3.00 1 -1.00 6 -1.00 6 -4.50 5 -4.50 6 -4.50 6 -0.13 6 -0.50 8 -1.00 6 -0.50 8 -1.00 6 -0.50 6 -0.50 7 -0.50 8 -1.00	-3.9 -5.3 -4.9 -1.7 -6.6 -13.1 0.0 -6.6 -13.1 0.4 5.1 23.9 6.3 -4.8 -4.1 4.2 -12.1	APCC ADPT CBEXX CREA! RACE DTM EMC EMCX ESCC EXBT IISLF IOMG IPLS IKMAG MTSI PFAK PNCL AQM QNTM RDUS SEG	19.50 65.75 10.63 12.25 12.75 8.88 27.75 21.38 29.00 22.75 4.13 55.13 8.25 37.00 22.25 34.75 19.75 6.75 6.75 6.75 4.88	7.88 35.00 3.50 3.63 4.13 13.25 6.38 19.00 11.38 1.44 3.75 11.25 11.28 4.88 3.25 10.88 0.94	AMERICAN POWER CONVERSION DATE TO THE COMMITTED TO THE CO
MUEL 23.5.0 MIPNY 02.5 SUNW 70.25 SUNW 70.25 AMH 13.50 DGN 19.13 DEC 76.50 IBM 135.38 MDCD 22.5 NETF 6.50 SQNT 19.13 SQQ 7.38 SRA 36.13 TOM 15.25 UIS 9.13 ADBE 74.25 ADBE 74.25	36.88 8.75 49.88 19.50 34.75 6.75 9.00 28.38 83.13 6.50 2.38 10.13 1.88 16.63 8.38 5.36	MICRON INTERNATIONAL INC. NEC AMERICA. SEC. 400. SUM MICROSYSTEMS INC. AMDANI CORP. DATA GENERAL CORP. DATA GENERAL CORP. DIGTAL EQUIMMENT CORP. (L) BM (H) MESTIONN DATAINC. MESTIONN DATAINC. SEQUIMS TOMPUTE SYS. SEQUIM SYSTEMS INC. TARDERA COMPUTES INC. UNISYS CORP. ADDRES SYSTEMS INC. ADDRES SYSTEMS INC.	9,94 14,22 29,71 127,77 17,77 3,56 14,81 2,56 23,66 34,11 5,7	3 -1.88 5 -2.00 1 -3.00 1 -3.00 1 -1.00 3 -1.00 5 -1.00 5 -1.00 5 -0.50 5 -0.38 0 -0.13 3 -1.00 0 -0.13 3 -1.00 0 -0.13 3 -1.00 0 -0.13 3 -1.00 0 -0.13 3 -1.00 0 -0.13 0 -0.13	-3.9 -9.9 -5.3 -4.9 -1.7 0.0 -6.6 -13.1 0.4 5.1 23.9 -4.8 -4.1 4.2 -12.1	APCC ADPT CBEX CREAI RACE DTM EMC EMC EMCX ESCC EXBT JISLF IOMG IPLS KMAG MTSI PEAK PNCL AQM QNTM ROUS SEG STE	19.50 65.75 10.63 12.25 12.75 8.88 27.75 21.38 29.00 22.75 4.13 55.13 8.25 37.00 22.25 34.75 19.75 6.75 6.75 6.75 4.88	7.88 35.00 3.50 3.63 4.13 13.25 6.38 19.00 11.38 1.44 3.75 11.25 11.28 4.88 3.25 10.88 0.94	AMERICAN POWER CONVERSION DATE TO THE COMMITTED TO THE CO
MUEL 23.5.0 MIPNY 02.5 SUNW 70.25 SUNW 70.25 AMH 13.50 DGN 19.13 DEC 76.50 IBM 135.38 MDCD 22.5 NETF 6.50 SQNT 19.13 SQQ 7.38 SRA 36.13 TOM 15.25 UIS 9.13 ADBE 74.25 ADBE 74.25	36.88 8.75 49.88 19.50 34.75 6.75 9.00 28.38 83.13 6.50 2.38 10.13 1.88 16.63 8.38 5.36	MICRON INTERNATIONAL INC. NEC AMERICA. SEC. 400. SUM MICROSYSTEMS INC. AMDANI CORP. DATA GENERAL CORP. DATA GENERAL CORP. DIGTAL EQUIMMENT CORP. (L) BM (H) MESTIONN DATAINC. MESTIONN DATAINC. SEQUIMS TOMPUTE SYS. SEQUIM SYSTEMS INC. TARDERA COMPUTES INC. UNISYS CORP. ADDRES SYSTEMS INC. ADDRES SYSTEMS INC.	9.94 14.2: 29.7: 127.7: 14.8: 23.6: 12.5: 23.6: 14.8: 25.6: 23.6: 34.1: 5.7: 5.7: 26.2:	1.88 -2.00 -3.00 -3.00 -1.00 -3.00 -1.00 -	-3.9 -9.9 -5.3 -4.9 -1.7 -6.6 -13.1 0.0 -6.6 -13.1 0.1 23.9 -6.8 -6.8 -6.8 -6.2 -15.7	APCC ADPT CBEXX CREAI RACE DTM EMC EMCX ESCC EXBIT IISLF IOMG IPLS KMAG MTSI PEAK PNCL AQM QNTM ROUS SEG STK STIC	19.50 65.75 10.63 12.25 12.75 8.88 27.75 21.38 29.00 22.275 4.13 55.13 8.25 37.00 22.25 34.75 19.75 6.13 4.88 69.00 44.50 8.75	7.88 35.00 3.50 3.63 4.13 13.25 6.38 19.00 11.38 1.44 3.75 1.63 17.63 11.25 11.28 4.88 3.25 10.88 0.94 36.13 32.20 1.20 1.20 1.20 1.20 1.20 1.20 1.20	AMERICAN POWER CONVERSION DATA REAC INC. CAMBRIS CORP. CREATIVE TECHNOLOGY LTO. DATA RACE INC. THE STATE OF TH
MUEL 23.50 MIN NO MINNY DISTRIBUTED NO MINNY DISTRI	36.88 8.75 49.88 19.50 34.75 6.75 9.00 28.38 83.13 6.50 28.38 10.13 1.88 16.63 8.38 5.36	MICRON INTERNATIONAL INC. NEC AMERICA. SILCOM GRANHOS (I) SILCOM GRANHOS INC. AMDANE CORP. DATA GENERAL CORP. DIGTAL EQUIMMENT CORP. (I) IBM (II) IBM (II) MEDIAN DATA INC. NETRAME (I) SEQUIM SYSTEMS INC. STRATUS COMPUTES INC. LININGS COMPUTES INC. LININGS CORP. ADOBE SYSTEMS INC. AMERICAN SOFTWARE INC.	9.94 18.25 54.00 19.55 59.36 9.94 14.21 29.77 127.77 7.77 3.55 14.81 2.56 23.66 34.11 5.77 26.2	1.88 -2.00 -3.00 -3.00 -3.00 -3.00 -3.00 -1.00 -3.00 -1.00 -3.00 -1.00 -3.00 -1.00 -3.00 -	-3.9 -9.9 -5.3 -4.9 -1.7 -0.0 -6.6 -13.1 -0.4 -5.1 23.9 -6.3 -4.8 -4.1 -4.2 -12.1	APCC ADPT CBEX RACE DTM EMC EMLX ESCC EXBT IISLF IOMG IPLS RAGE AQMT ROUS SEG STIC TEK WDC	19.50 65.75 10.63 12.25 12.75 8.88 27.75 21.38 29.00 22.275 4.13 55.13 8.25 37.00 22.25 34.75 19.75 6.13 4.88 69.00 44.50 8.75	7.88 35.00 3.50 3.63 4.13 13.25 6.38 19.00 11.38 1.44 3.75 1.63 17.63 11.25 11.28 4.88 3.25 10.88 0.94 36.13 32.20 1.20 1.20 1.20 1.20 1.20 1.20 1.20	AMERICAN POWER CONVERSION DATA REAC INC. CAMBRIS CORP. CREATIVE TECHNOLOGY LTO. DATA RACE INC. THE STATE OF TH
MUEL 23.5.0 MIPNY 07.25 SUHW 70.25 AMH 13.50 DGN 19.13 DEC 76.50 IBM 13.58 MDCD 20.25 NETF 6.50 SQNT 19.13 SEQS 73.8 SRA 36.13 TOM 15.5 UIS 9.13 ADBE 74.25 APUX 42.50 APUX 42.50 APU	36.88 8.75 49.88 19.50 34.75 6.75 9.00 28.38 83.13 6.50 2.38 10.13 1.88 16.63 3.63 12.13 28.75 28.50 3.63 12.17 28.75	MICRON INTERNATIONAL INC. NEC AMERICA STLCOM GRAPHICS (I) STUDIO GRAPHICS (II) AMINIATE CORP. DATA GENERAL CORP. DIGITAL EQUIPMENT CORP. (I) BIM (II) BIM (II) BIM (II) BIM (II) BIM (III) BIM (III) SEQUENT COMPUTE STG. SEQUENT COMPUTE STG. SEQUENT COMPUTE INC. TARDEM COMPUTES INC. UNISYS CORP. ADOBE SYSTEMS INC. AMERICAN SOFTWARE INC. AREORE SOFTWARE INC. AREOR SOFTWARE INC. AREOR SOFTWARE INC. AREOR SOFTWARE INC. AREOR SOFTWARE INC. ASSOCIATED SOFTWARE INC. ASSOCIATION OF THE STR.	9.94 18.25 54.00 19.55 59.36 9.94 14.21 29.77 127.77 7.77 3.55 14.81 2.56 23.66 34.11 5.77 26.2	1.88 -2.00 -3.00 -3.00 -3.00 -3.00 -3.00 -1.00 -3.00 -1.00 -3.00 -1.00 -3.00 -1.00 -3.00 -	-3.9 -9.9 -5.3 -4.9 -1.7 0.0 -1.3.1 0.4 5.1 23.9 6.3 -4.1 4.2 -12.1	APCC ADPT CBEX CREAI RACE DTM EMC EXBT IISLF IOMG IPLS KMAG MTSI PEAK PNCL AQM QNTN ROUS SEG STIC TEK	19.50 65.75 10.63 12.25 12.75 8.88 27.75 21.38 29.00 22.75 4.13 55.13 8.25 37.00 22.25 34.75 19.75 6.75 6.75 6.75 4.88	7.88 35.00 3.50 3.63 4.13 13.25 6.38 19.00 11.38 1.44 3.75 1.63 17.63 11.25 11.28 4.88 3.25 10.88 0.94 36.13 32.20 1.20 1.20 1.20 1.20 1.20 1.20 1.20	AMERICAN POWER CONVERSION DATA REAC INC. CAMBRIS CORP. CREATIVE TECHNOLOGY LTO. DATA RACE INC. THE STATE OF TH
MUEL 23.50 NIPNY 02.11 SGI 38.75 SUHW 70.25 AMH 13.50 DGN 19.13 DEC 76.50 BM 13.50 MCD 20.38 MCD 20.3	36.88 8.75 49.88 19.50 34.75 6.75 9.00 28.38 83.13 6.50 2.38 10.13 1.88 16.63 3.63 12.13 28.75 28.50 3.63 12.17 28.75	MICRON INTERNATIONAL INC. NEC AMERICA STLCOM GRAPHICS (I) STUDIO GRAPHICS (II) AMINIATE CORP. DATA GENERAL CORP. DIGITAL EQUIPMENT CORP. (I) BIM (II) BIM (II) BIM (II) BIM (II) BIM (III) BIM (III) SEQUENT COMPUTE STG. SEQUENT COMPUTE STG. SEQUENT COMPUTE INC. TARDEM COMPUTES INC. UNISYS CORP. ADOBE SYSTEMS INC. AMERICAN SOFTWARE INC. AREORE SOFTWARE INC. AREOR SOFTWARE INC. AREOR SOFTWARE INC. AREOR SOFTWARE INC. AREOR SOFTWARE INC. ASSOCIATED SOFTWARE INC. ASSOCIATION OF THE STR.	9.94 14.22 29.77 127.77 7.77 3.56 12.55 6.31 34.1 5.7 26.2 38.2 34.2 34.2 34.2 34.2 34.2 34.2 34.2 34	1.88 -2.00 -3.00 -3.00 -3.00 -3.00 -1.00 -3.00 -1.00 -1.00 -4.50 -	-3.9 -9.9 -5.3 -4.9 -1.7 -6.6 -13.1 -6.8 -5.2 -15.7 1.0 -6.8 -5.2 -15.7 1.0 -6.8	APCC ADPT CBEX RACE DTM EMC ESCC ESCC EXBT IISLF IOMG IPLS KMAG MTSI PEAK APNCL AQMIN ROUS SEG STIC TEK WDC XRX	19.50 65.75 10.63 12.25 12.75 8.88 27.75 21.38 29.00 22.275 4.13 55.13 8.25 37.00 22.25 34.75 19.75 6.13 4.88 69.00 44.50 8.75	7.88 35.00 3.50 3.63 4.13 13.25 6.38 19.00 11.38 1.44 3.75 1.63 17.63 11.25 11.28 4.88 3.25 10.88 0.94 36.13 32.20 1.20 1.20 1.20 1.20 1.20 1.20 1.20	AMERICAN POWER CONVERSION DATA REAC INC. CAMBRIS CORP. CREATIVE TECHNOLOGY LTO. DATA RACE INC. THE STATE OF TH
MUEL 23.5.0 MIPNY 02.5 SUHW 70.25 SUHW 70.25 AMH 13.50 DGG 19.13 D	36.88 8.75 49.88 19.50 34.75 6.75 9.00 28.38 83.13 6.50 2.38 10.13 1.88 16.63 3.63 12.13 28.75 12.13 28.75 12.75 12.50 19.75	MICRON INTERNATIONAL INC. NEC AMERICA STLCOM GRAPHICS (I) STUDIO GRAPHICS (II) AMINIATE CORP. DATA GENERAL CORP. DIGITAL EQUIPMENT CORP. (I) BIM (II) BIM (II) BIM (II) BIM (II) BIM (III) BIM (III) SEQUENT COMPUTE STG. SEQUENT COMPUTE STG. SEQUENT COMPUTE INC. TARDEM COMPUTES INC. UNISYS CORP. ADOBE SYSTEMS INC. AMERICAN SOFTWARE INC. AREORE SOFTWARE INC. AREOR SOFTWARE INC. AREOR SOFTWARE INC. AREOR SOFTWARE INC. AREOR SOFTWARE INC. ASSOCIATED SOFTWARE INC. ASSOCIATION OF THE STR.	9.94 14.21 29.71 12.71 12.71 12.71 12.71 14.81 2.51 23.66 34.1 5.7 26.2 34.1 5.7 26.2 34.1 5.7 26.2 34.2 34.1 5.7 26.2 34.2 34.2 34.2 34.2 34.2 34.2 34.2 34	3 -1.88 -2.00 -3.00 -3.00 -1.00 -3.100 -5 -1.00 -5 -1.00 -5 -0.55 -0.38 -1.00 -0.50 -1.00 -5 -0.55 -0.38 -1.00 -0.50 -1.00 -0.50 -1.00 -0.50 -1.00 -0.50 -1.00 -0.50 -1.00 -0.50 -1.00 -0.50 -1.00 -0.50 -1.00 -0.50 -1.00 -0.50 -1.00 -0.50 -1.00 -0.50 -1.00 -0.50 -1.00 -0.50 -1.00 -0.50 -1.00 -0.50 -1.00 -0.50 -0.55 -0.31 -1.00 -0.50 -0.55 -0.31 -0.55 -0.35 -0.25 -0.	-3.9 -9.9 -5.3 -4.9 -1.7 0.0 -6.6 -13.1 0.4 -5.1 23.9 -4.8 -4.1 -4.2 -12.1 -6.8 -5.2 -15.7 -1.0 -6.0 -1.1 -6.0 -1.2 -1.2	APCC ADPT CBEX RACE DTM EMC EMLX ESCC EXBT IISLF IOMG IPLS RAGE AQMT ROUS SEG STIC TEK WDC	19.50 65.75 10.63 12.25 12.75 8.88 27.75 21.38 29.00 22.275 4.13 55.13 8.25 37.00 22.25 34.75 19.75 6.13 4.88 69.00 44.50 8.75	7.88 35.00 3.50 3.63 4.13 13.25 6.38 19.00 11.38 1.44 3.75 1.63 17.63 11.25 11.28 4.88 3.25 10.88 0.94 36.13 32.20 1.20 1.20 1.20 1.20 1.20 1.20 1.20	AMERICAN POWER CONVERSION DATA REAC INC. CAMBRIS CORP. CREATIVE TECHNOLOGY LTO. DATA RACE INC. THE STATE OF TH
MUEL 23.50 MIPNY 02.11 MIPNY 02.11 MIPNY 02.12 MIPNY 0	36.88 49.88 49.88 19.50 34.75 6.75 9.00 28.38 83.13 6.63 83.83 10.13 11.13 12.13 83.83 83.83 12.13 83.83 12.13 83.83 12.13 83.83 12.13 83.83 12.13 83.83 12.13 83.83 83 83.83 83 83 83 83 83 83 83 83 83 83 83 83 8	MICROS INTERNATIONAL INC. NEC AMERICA. SILCOM GRAPHICS (I) SILCOM GRAPHICS (I) AMDAIL CORP. DATA GENERAL CORP. DATA GENERAL CORP. DIGTAL EQUIPMENT CORP. (I) BM (H) MEDIUM DATA INC. NET RAME (I) SEQUIPMENT SIR. SEQUIPMENT SIR. SEQUIPMENT SIR. ADOBE SYSTEMS INC. AMERICAN SOFTWARE INC. AMERICAN SOFTWARE INC. AMERICAN SOFTWARE INC. AMERICAN SOFTWARE INC. BMC SOFTWARE INC. B	45.6 18.22 54.00 19.51 59.38 14.22 29.71 127.77 7.77 3.55 14.88 12.56 6.31 34.11 5.77 26.2 38.8 22.7 43.2 83.0 26.0 5.3 3	1.88	3.99 9.99 9.99 9.99 1.7 1.7 0.0 0.0 0.1 1.3 1.1 23.99 4.8 4.2 4.1 4.2 1.2 1.1 6.8 5.1 4.9 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7	APCC ADPT CBEX CREAL RACE DTM EMC ESCC ESCC ESCC EXBT IISLF IOMG IPLS KMAG MTSI PEAK PNCL AQM QNTM RDUS SEG STIC TEK WDC XRX	19.50 65.75 10.63 F 12.25 12.75 8.88 27.75 21.38 29.00 22.25 34.75 37.00 22.25 34.75 4.88 69.00 44.50 8.75 59.75 49.25 58.25	7.88 35.00 3.00 3.63 3.53 3.53 4.13 13.25 6.38 19.00 11.38 3.75 11.25 11.25 11.25 10.81 0.94 4.88 3.25 10.81 0.94 4.88 3.25 10.81 10	AMERICAN POWER CONVERSION DATA RACE INC. DAMBER CORP. CAMBRIC CORP. CAMBRIC CORP. DATA RACE INC.
MUEL 23-50 MIPHY 02-31 SGI 38-75 SGI	36.88 49.88 49.88 19.50 34.75 6.75 9.00 28.38 83.13 6.63 83.83 10.13 11.13 12.13 83.83 83.83 12.13 83.83 12.13 83.83 12.13 83.83 12.13 83.83 12.13 83.83 12.13 83.83 83 83.83 83 83 83 83 83 83 83 83 83 83 83 83 8	MICROS INTERNATIONAL INC. NEC AMERICA. SILCOM GRAPHICS (I) SILCOM GRAPHICS (I) AMDAIL CORP. DATA GENERAL CORP. DATA GENERAL CORP. DIGTAL EQUIPMENT CORP. (I) BM (H) MEDIUM DATA INC. NET RAME (I) SEQUIPMENT SIR. SEQUIPMENT SIR. SEQUIPMENT SIR. ADOBE SYSTEMS INC. AMERICAN SOFTWARE INC. AMERICAN SOFTWARE INC. AMERICAN SOFTWARE INC. AMERICAN SOFTWARE INC. BMC SOFTWARE INC. B	45.6.1 18.2′1 19.5′3 19.5′3 14.2′1 29.7′7 7.7′7 7.7′7 3.5′1 14.8′1 25.6.3 14.5′1 26.2 34.1.1 26.2 34.1.1 26.2 34.1.1 26.2 34.1.1 26.2 34.1 34.1 34.1 34.1 34.1 34.1 34.1 34.1	3 - 1.88 - 2.00 3 - 1.00 3 -	3.99 9.99 9.99 9.99 1.7 1.7 0.0 0.0 0.1 1.3 1.1 23.99 4.8 4.2 4.1 4.2 1.2 1.1 6.8 5.1 4.9 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7	APCC ADPT CBEX CREAI CREAI CREAI CREM CEMCX ESCC EXBT IISLF IOMG IPLS KMAG MTSI PEAK PNCL AQM QNTM RDUS SEG STIK STIC TEK WDC XRX	19.50 65.75 10.63 F 12.25 12.75 8.88 27.75 21.38 29.00 22.75 4.13 55.13 8.25 34.75 19.75 4.6.75 4.6.75 4.6.75 4.50 4.50 8.75 5.9.75 4.9.25 4.9.25 5.8.25	7.88 35.00 3.50 3.63 3.53 3.63 3.13 2.63 11.28 4.12 11.28 3.25 10.34 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34	AMERICAN POWER CONVERSION ADMETICAL PARTY CONTROL OF THE PARTY CONTROL O
MUEI 23-50 MIPHY 69-38 SGI 38-75 SGI	36.88 8.75 49.88 19.50 34.75 49.88 19.50 34.75 6.75 9.00 28.38 31.3 6.50 2.50 31.88 32.53 6.50 22.50 19.75 22.50 19.75 32.50 19.75 4.88 11.75 4.88 11.75	MICROW INTERNATIONAL INC. NEC AMERICA. AMDANI. CORP. DATA GENERAL CORP. TO DATA ELEMPRIST CORP. (1) MERIDAN DATA INC. NETFAME (1) SEQUENT COMPUTER INC. TANDEM COMPUTER INC. LINISYS CORP. AMOBIE SYSTEMS INC. LINISYS CORP. AMOBIE SYSTEMS INC. AMERICAN SOFTWARE INC. BOS SYSTEMS INC. BOS SYSTEMS INC. BOS SYSTEMS INC. BOS SYSTEMS INC. BOS STATING SINC.	45.6.3 18.2'54.0 19.5 19.5 14.2'29.7', 7.7' 7.7' 2.5 14.8 12.5 6.3 14.1 22.7 26.2 23.8 8.3 22.7 26.2 38.8 30.0 30.0 31.5 31.5 31.5 31.5 31.5 31.5 31.5 31.5	3 - 1.88	3.99 9.99 5.33 4.99 1.7 1.7 0.0 6.6 13.1 1.2 1.2 1.2 1.2 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3	APCC ADPT CBEX CREAI CREAI CREAI CREM CEMCX ESCC EXBT IISLF IOMG IPLS KMAG MTSI PEAK PNCL AQM QNTM RDUS SEG STIK STIC TEK WDC XRX	19.50 65.75 10.63 F 12.25 12.75 8.88 27.75 21.38 29.00 22.75 4.13 55.13 8.25 34.75 19.75 4.6.75 4.6.75 4.6.75 4.50 4.50 8.75 5.9.75 4.9.25 4.9.25 5.8.25	7.88 35.00 3.50 3.63 3.53 3.63 3.13 2.63 11.28 4.12 11.28 3.25 10.34 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34 3.25 10.34	AMERICAN POWER CONVERSION ADMETICAL PARTY CONTROL OF THE PARTY CONTROL O
MUEL 23-50	36.88 8.75 49.88 19.50 34.75 49.88 19.50 34.75 6.75 9.00 28.38 31.3 6.50 2.50 3.63 10.13 1.88 3.28 5.36 12.13 28.75 18.50 2.88.75 18.50 2.87 4.88 11.75 32.50 19.75 32.50 2.88 11.75 32.50 2.88 11.75 32.50 2.88 11.75 32.50 2.88 11.75 32.50 3.63 11.75 32.50 3.63 11.75 32.50 3.63 3.63 3.63 3.63 3.63 3.63 3.63 3.6	MICROW INTERNATIONAL INC. NEC AMERICA. AMDANE CORP. DATA GENERAL CORP. DATA INC. NETFAME (I). SEQUENT COMPUTER SYS. SEQUENT SYSTEMS INC. LINESYS CORP. ADDRESS OF TWANTE INC. BOS SYSTEMS INC. APPLUS INC. APPLUS INC. BOS SYSTEMS INC. CHECKER SOFTWARE INC. BOS SYSTEMS INC. CHECKER SOFTWARE INC. BOS LONGER INC. BOS SOFTWARE INC. BOS LONGER INC. BOS LONGER INC. CHECKER SOFTWARE INC.	45.6.2 54.0.1 9.9.3 14.2:5 9.9.3 14.2:7 127.7 127.7 3.5 14.8 18.2 12.5 12.5 12.5 12.5 12.5 12.5 12.5 13.6 13.6 13.6 13.6 13.6 13.6 13.6 13.6	3 - 1.88	3.99 -5.3 -4.99 -1.7 0.0 -6.6 -13.1 -5.1 -13.1 -5.1 -13.1 -4.8 -4.1 -4.2 -12.1 -15.7 -15.7 -15.0 -1.5	APCC ADPT CBEX CREAI RACE DIM EMC EMLX ESCC EXBT IISLF IOMG IPLS KMAG MTSI PEAK PNCL AQM QNTM RDUS SEG STK STLC TEK WDC XRX	19.50 65.75 10.63 65.75 10.63 10.63 10.63 10.63 10.63 12.75 11.38 29.00 11.35 13.70 13.70 14.13 15.13 16.75 16.75 17.75 18.75	7.88 35.00 3.00 3.60 3.63 3.53 4.13 13.25 6.38 19.90 11.38 4.88 3.25 11.28 4.88 3.25 11.28 4.88 3.25 11.28 4.88 3.25 11.28 4.88 3.25 11.28 4.88 3.25 11.28 4.88 3.25 11.28 4.88 3.25 11.28 4.88 3.25 11.28 1	AMBERGAM POWER CONVERSION ADAPTEC IN. CAMBER CORP. CAMBER CORP. CAMBER CORP. CAMBER CORP. EMICLES CORP. AMERICAN MOMENT. SYSTEMS AMALYSIS BIT! AMERICAN MOMENT. SYSTEMS AMALYSIS BIT! AMERICAN MOMENT. SYSTEMS AMALYSIS BIT!
MUEL 23-50 MINIPY 69-38 SGI 38-75 SUHW 70-25 SUHW 70-25 SGI 38-75	36.88 8.75 49.88 19.50 34.75 49.88 19.50 34.75 6.75 9.00 28.38 31.3 6.50 2.50 3.63 10.13 1.88 3.28 5.36 12.13 28.75 18.50 2.88.75 18.50 2.87 4.88 11.75 32.50 19.75 32.50 2.88 11.75 32.50 2.88 11.75 32.50 2.88 11.75 32.50 2.88 11.75 32.50 3.63 11.75 32.50 3.63 11.75 32.50 3.63 3.63 3.63 3.63 3.63 3.63 3.63 3.6	MICROW INTERNATIONAL INC. NEC AMERICA. AMDANE CORP. DATA GENERAL CORP. DATA INC. NETFAME (I). SEQUENT COMPUTER SYS. SEQUENT SYSTEMS INC. LINESYS CORP. ADDRESS OF TWANTE INC. BOS SYSTEMS INC. APPLUS INC. APPLUS INC. BOS SYSTEMS INC. CHECKER SOFTWARE INC. BOS SYSTEMS INC. CHECKER SOFTWARE INC. BOS LONGER INC. BOS SOFTWARE INC. BOS LONGER INC. BOS LONGER INC. CHECKER SOFTWARE INC.	45.6.2 54.0.1 9.9.3 14.2:5 9.9.3 14.2:7 127.7 127.7 3.5 14.8 18.2 12.5 12.5 12.5 12.5 12.5 12.5 12.5 12	3 - 1.88	3.99 -5.3 -4.99 -1.7 -1.7 -1.7 -1.7 -1.7 -1.7 -1.3	APCC APPT CBEX CRAIR RACE DIM EMC EMC EMC EMC EMC EMC EMC EMC EMC EM	19.50 65.75 10.63 65.75 10.63 10.63 10.63 10.63 10.63 12.75 11.38 29.00 11.35 13.70 13.70 14.13 15.13 16.75 16.75 17.75 18.75	7.88 35.00 3.00 3.60 3.63 3.53 4.13 13.25 6.38 19.90 11.38 4.88 3.25 11.28 4.88 3.25 11.28 4.88 3.25 11.28 4.88 3.25 11.28 4.88 3.25 11.28 4.88 3.25 11.28 4.88 3.25 11.28 4.88 3.25 11.28 4.88 3.25 11.28 1	AMBERGAM POWER CONVERSION ADAPTEC IN. CAMBER CORP. CAMBER CORP. CAMBER CORP. CAMBER CORP. EMICLES CORP. AMERICAN MOMENT. SYSTEMS AMALYSIS BIT! AMERICAN MOMENT. SYSTEMS AMALYSIS BIT! AMERICAN MOMENT. SYSTEMS AMALYSIS BIT!
MUEL 23-50 MINIPY 69-38 SGI 38-75 SUHW 70-25 SUHW 70-25 SGI 38-75	36.88 8.75 49.88 19.50 34.75 49.88 19.50 34.75 6.75 9.00 28.38 31.3 6.50 2.50 3.63 10.13 1.88 3.28 5.36 12.13 28.75 18.50 2.88.75 18.50 2.87 4.88 11.75 32.50 19.75 32.50 2.88 11.75 32.50 2.88 11.75 32.50 2.88 11.75 32.50 2.88 11.75 32.50 3.63 11.75 32.50 3.63 11.75 32.50 3.63 3.63 3.63 3.63 3.63 3.63 3.63 3.6	MICROW INTERNATIONAL INC. NEC AMERICA. AMDANE CORP. DATA GORRAL CORP. SEQUIDA SYSTEMS INC. SEQUIDA SYSTEMS INC. JUNISTS CORP. ADORE SYSTEMS INC. ARROR SOFTWARE INC. BIGS SYSTEMS INC. GRING SOFTWARE INC. BOBLASO INT'S INC. GRIN SOFTWARE INC. DOBLASO INT'S INC. CAYCHINE SOFTWARE INC. COMOG SIRC. CAYCHINE SOFTWARE INC. COMOG SIRC. CAYCHINE SOFTWARE INC. CORP. CAYCHINE SOFTWARE INC. CAYCHINE SOFTWARE IN	45.6.2 54.01 9.9.9 14.2:2 9.9.7 127.7 3.5 12.5 6.3 34.1 5.7 26.2 83.0 26.0 3.0 26.0 3.0 4.0 26.0 3.0 4.0 26.0 3.0 4.0 3.0 4.0 3.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4	3 - 1.88	-3.99 -9.99 -5.3 -4.99 -1.7 -1.7 -1.7 -1.7 -1.7 -1.7 -1.7 -1.3 -1.	APCC APPT CPR APCE APCE APCE APCE APCE APCE APCE APCE	19.50 65.75 10.63 17.22 8.88 29.00 27.75 4.13 8.25 34.75 6.75 6.75 4.13 4.88 29.00 44.50 44.50 44.50 45.22 45.25 4	7.88 35.00 3.60 3.63 3.63 3.63 4.13 13.25 11.28 11.25 11.28 3.25 11.25 1	AMBERGAM POWER CONVERSION ADAPTIC IN. CAMBER CORP. CAMBRIDGE CORP. CAMBER CORP. CAMBRIDGE CORP. CAMBER CORP.
MUEL 23-50	36.88 8.75 49.88 8.75 9.00 34.75 9.00 34.75 9.00 34.75 9.00 36.75	MICROW INTERNATIONAL INC. MICC AMERICA. REC AMERICA. AMDAHL CORP. DATA GENERAL CORP. DATA GENERAL CORP. DATA GENERAL CORP. DIATA EQUIPMENT CORP. (L) MERIDAN DATA INC. MERIDAN DATA INC. METERAME (L) SEQUENT COMPUTER SYS. SEQUENT COMPUTER SYS. SEQUENT COMPUTER SYS. ADORE SYSTEMS INC. LINESY CORP. ADORE SYSTEMS INC. ADORE SYSTEMS INC. BOS SYSTEMS INC. BOS SYSTEMS INC. BOS SYSTEMS INC. BOS SYSTEMS INC. CORP. BOS STATES INC. BOS SYSTEMS INC. CORP. BOS STATES INC. CONTROL OF THE SYSTEMS INC. CONTROL O	45.6.2 45.6.3 4.1.1 4.2.5 4.0 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1	3 - 1.88	3.99 -5.3 -4.99 -5.3 -4.99 -6.00 -6.00 -6.13 -1.7 -6.13 -6.3 -6.8 -5.2 -12.1 -1.2 -1.2 -1.2 -1.2 -1.2 -1.2 -1.2 -1.3	APCC APPT CBEX CREAM EMC CREAM EMC EMCX ESSC EXBIT JISLF IOMG IPLS KMAG MTSI PEAK PROUS SEG STIC XRX AMCY AMCY AMCY AMCY AMCY AMCY AMCY AMCY	19.50 65.75 10.63 75 12.25 8.89 29.00 22.25 4.13 8.15 37.00 22.25 19.75 69.00 44.50 69.00 44.50 69.00 44.50 69.00 44.50 69.00 44.50 69.00 44.50 69.00 69.75	7.88 35.000 3.503 3.603 3.633 4.131 13.252 11.28 11.25 11.28 4.32 11.25	AMERICAN POWER CONVERSION AMERICAN CAMBRIC CORP. CAMBRIC CORP. CARTATE TECHNOLOGY LTO. DATA RACE INC. DATA RACE
MUEI 23-50 MINITY 69-31 MINITY	36.88 8.75 49.88 8.75 49.88 83.13 1.88 83.25 3.36 12.13 1.88 12.15 12.50 32.38 10.10 12.13 12.15	MICROW INTERNATIONAL INC. MICCAMERICA. MICCAMERICA. AMDANI (CORP. DATA GENERAL CORP. DATA GENERAL CORP. DATA GENERAL CORP. DITAL EQUIPMENT CORP. (L) BMA (M) DATA INC. METPAME (L) SEQUENT COMPUTER SYS. AMERICAN SOFTWARE INC. LINISYS CORP. MICCAMERICAN SOFTWARE INC. BOS SYSTEMS INC. BOS SYSTEMS INC. BOS SYSTEMS INC. BOS SYSTEMS INC. COMPUTER SYSTEMS INC. COMPUTER SOFTWARE INC. COMPUTER SOFT	45.6.1 9.9.9.1 14.2:1 127.7	3 - 1.88	-3.99 -9.99 -5.3 -4.99 -1.7 -1.7 -1.7 -1.7 -1.7 -1.7 -1.7 -1.8 -1.	APCC APPT CBEX CREAL RACE DTM EMC EMCX ESCC EXBIT JISLF JOMG JOME RACE EXBIT JISLF JOMG JOME RACE EXBIT JISLF JOMG JOME JOME JOME JOME JOME JOME JOME JOME	19:50 65.75 10:63 75 12:25 8.88 29:90 22:25 4:13 37:00 22:25 55:13 4.88 55:13 4.88 55:19 75:59 7	7.88 35.000 3.503 3.603 3.633 4.131 13.252 11.28 11.25 11.28 4.32 11.25	AMERICAN POWER CONVERSION AMERICAN CAMBRIC CORP. CAMBRIC CORP. CARTATE TECHNOLOGY LTO. DATA RACE INC. DATA RACE
MUEI 23-50 MINITY 69-31 MINITY	36.88 8.75 49.88 8.75 49.88 83.13 1.88 83.25 3.36 12.13 1.88 12.15 12.50 32.38 10.10 12.13 12.15	MICROW INTERNATIONAL INC. MICCAMERICA. MICCAMERICA. AMDANI (CORP. DATA GENERAL CORP. DATA GENERAL CORP. DATA GENERAL CORP. DITAL EQUIPMENT CORP. (L) BMA (M) DATA INC. METPAME (L) SEQUENT COMPUTER SYS. AMERICAN SOFTWARE INC. LINISYS CORP. MICCAMERICAN SOFTWARE INC. BOS SYSTEMS INC. BOS SYSTEMS INC. BOS SYSTEMS INC. BOS SYSTEMS INC. COMPUTER SYSTEMS INC. COMPUTER SOFTWARE INC. COMPUTER SOFT	45.6.1 9.9.9.1 14.2:1 127.7	3 - 1.88	-3.99 -9.99 -5.3 -4.99 -1.7 -6.6 -6.6 -13.1 -23.99 -6.3 -4.1 -4.2 -12.1 -6.8 -5.2 -12.1 -15.7 -10.1 -1	APCC APPT CBEX CREAI RACE DTM EMC EMCX ESCC EXBIT JISLIT J	19.50 65.75 10.63 7 12.25 8.88 27.75 21.38 55.13 37.00 22.75 19.75	7.88 35.000 3.503 3.603 3.633 4.131 13.252 11.28 11.25 11.28 4.32 11.25	AMERICAN POWER CONVERSION DATA RACE INC. DATE RACE INC. DATA RACE
MUEL 23-50 MINITY 69-30 SENTINY 70-25 MINITY	36.88 8.75 19.50 28.38 83.13 6.675 9.00 28.38 83.13 6.675 9.00 28.38 13.18 83.28 75 14.18 14.13 28.75 14.00 29.75 4.00 29.75 15.50 32.13 14.75 15.50 32.13 14.75 15.50 32.13 32.13 5.15 5.36	MICROS INTERNATIONAL INC. NEC AMERICA. AMDANE CORP. DATA GENERAL CORP. LIBORITAL EQUIPMENT COMP. (L) SEQUENT COMPUTER INC. TAROBEAU COMPUTER INC. TAROBEAU COMPUTER INC. TAROBEAU COMPUTER INC. TAROBEAU COMPUTER INC. AMERICAN SOFTWARE INC. APPULS INC. ARROR SOFTWARE INC. BOULE SEND ÉRABAGE BOLAND INT. (L) UL CETURA SOFTWARE INC. COMPUTER INC. COMPUTER INC. COMPUTER INC. COMPUTER INC. COMPUTER INC. COMPUTER SOFTWARE INC. COMPUTER SOFTWARE INC. COMPUTER SOFTWARE INC. COMPUTER ASSOCIATES	45.6.2 54.0.5 59.3 9.9.9 9.9.9 14.2 127.7	3 - 1.88	-3.99 -5.3 -9.99 -5.3 -4.99 -1.7 -6.6 -6.6 -13.1 -6.8 -5.2 -12.1 -15.7 -	APCC APPT CBEX CREAL RACE DTM EMCX ESCAT BSCT BSCT BSCT BSCT BSCT BSCT BSCT BSC	19:50 65:75 10:63 F 12:25 8.88 8.77.75 21:38 27:75 21:38 37:00 22:75 4:13 4:13 22:25 34:75 4:37 4:38 4:38 4:38 4:38 4:38 4:38 4:38 4:38	7.88 35,000 3.500 3.503 3.633 4.131 13.255 15.633 11.28 4.88 3.255 11.28 4.88 5.855 11.28 11.28	AMERICAN POWER CONVERSION DATA RACE INC. DATE RACE INC. DATA RACE
MUEL 23-50 MINIPLY 69-31 SUPPLY 69-31 SUPPLY 69-31 SUPPLY 69-31 SUPPLY 69-31 SUPPLY 69-31 SUPPLY 69-31 MIN C13-32 MIN C13	36.88 8.75 49.88 8.75 49.88 8.75 49.88 8.75 49.88 8.75 49.88 8.75 49.80 14.75	MICROS INTERNATIONAL INC. NEC AMERICA. AMDANE CORP. DATA GENERAL CORP. LIBORITAL EQUIPMENT COMP. (L) SEQUENT COMPUTER INC. TAROBEAU COMPUTER INC. TAROBEAU COMPUTER INC. TAROBEAU COMPUTER INC. TAROBEAU COMPUTER INC. AMERICAN SOFTWARE INC. APPULS INC. ARROR SOFTWARE INC. BOULE SEND ÉRABAGE BOLAND INT. (L) UL CETURA SOFTWARE INC. COMPUTER INC. COMPUTER INC. COMPUTER INC. COMPUTER INC. COMPUTER INC. COMPUTER SOFTWARE INC. COMPUTER SOFTWARE INC. COMPUTER SOFTWARE INC. COMPUTER ASSOCIATES	45.6.2 54.00 59.3 4.2 29.7 17.7 17.7 17.7 12.3 14.8 12.5 12.5 12.5 12.5 12.5 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0	3 - 1.88	-3.99 -5.3 -9.99 -5.3 -4.99 -1.7 -6.6 -6.6 -13.1 -1.7 -6.8 -5.1 -12.1 -6.8 -5.2 -12.1 -6.8 -5.2 -6.6 -6.8 -5.2 -6.6 -6.8 -6.6 -6.8 -6.6 -6.8 -6.8 -6.8	APCC APPT CBEX CREAL RACE DTM EMCX ESCAT BSCT BSCT BSCT BSCT BSCT BSCT BSCT BSC	19:50 65:75 10:63 F 12:25 8.88 8.77.75 21:38 27:75 21:38 37:00 22:75 4:13 4:13 22:25 34:75 4:37 4:38 4:38 4:38 4:38 4:38 4:38 4:38 4:38	7.88 35,000 3.500 3.503 3.633 4.131 13.255 15.633 11.28 4.88 3.255 11.28 4.88 5.855 11.28 11.28	AMERICAN POWER CONVERSION DATA RACE INC. DATE RACE INC. DATA RACE
MUEL 23-50 MINIPY 69-38 SGI 38-78 SG	36.88 8.75 49.88 8.75 49.88 8.75 49.88 8.75 49.88 8.75 49.88 8.75 49.80	MICROS INTERNATIONAL INC. NEC AMERICA. AMDANE CORP. DATA GENERAL CORP. LIBORITAL EQUIPMENT COMP. (L) SEQUENT COMPUTER INC. TAROBEAU COMPUTER INC. TAROBEAU COMPUTER INC. TAROBEAU COMPUTER INC. TAROBEAU COMPUTER INC. AMERICAN SOFTWARE INC. APPULS INC. ARROR SOFTWARE INC. BOULE SEND ÉRABAGE BOLAND INT. (L) UL CETURA SOFTWARE INC. COMPUTER INC. COMPUTER INC. COMPUTER INC. COMPUTER INC. COMPUTER INC. COMPUTER SOFTWARE INC. COMPUTER SOFTWARE INC. COMPUTER SOFTWARE INC. COMPUTER ASSOCIATES	45.6. 45.6. 45.6. 45.6. 45.6. 45.6. 45.6. 45.6. 45.6. 45.6. 45.6. 46.6.	3 - 1.88	-3.99 -3.99 -5.3 -4.99 -5.3 -4.99 -1.7 -6.6 -6.6 -13.1 -6.8 -6.1 -6.1 -6.1 -6.1 -6.1 -6.1 -6.1 -6.1	APCE APPER A	19.50 65.75 10.63 11.63 12.75 8.868 12.75 12.75 8.868 12.75 11.88 1.75 12.75 1	7.88 35.00 3.00 3.50 3.63 4.11 3.25 6.38 4.13 17.55 11.28 11.28 11.25 11	AMERICAN POWER CONVERSION DATA RACE INC. DATE RACE INC. DATA RACE
MUEI 23-50 MINITY 69-30 SENTIN 70-25 MINITY 69-30 MINITY 70-25 MINITY	36.88 8.75 49.88 13.75 49.88 13.75 49.88 13.13 6.50 2.8.38 10.13 1.15 12	MICROS INTERNATIONAL INC. NEC AMERICA. AMDANE CORP. DATA GENERAL CORP. LIBORITAL EQUIPMENT COMP. (L) SEQUENT COMPUTER INC. TAROBEAU COMPUTER INC. TAROBEAU COMPUTER INC. TAROBEAU COMPUTER INC. TAROBEAU COMPUTER INC. AMERICAN SOFTWARE INC. APPULS INC. ARROR SOFTWARE INC. BOULE SEND ÉRABAGE BOLAND INT. (L) UL CETURA SOFTWARE INC. COMPUTER INC. COMPUTER INC. COMPUTER INC. COMPUTER INC. COMPUTER INC. COMPUTER SOFTWARE INC. COMPUTER SOFTWARE INC. COMPUTER SOFTWARE INC. COMPUTER ASSOCIATES	45.6.2 54.0.0 59.3 4.2.2 29.7.7 17.7.7 17.7.7 12.3 14.8 12.5 14.8 12.5 12.5 12.5 12.5 13.5 13.5 13.5 13.5 13.5 13.5 13.5 13	3 - 1.88	-3.9 -9.9 -5.3 -4.9 -1.7 0.0 -6.6 -6.6 -13.1 -1.7 -1.7 -3.1 -4.2 -12.1 -4.2 -12.1 -5.2 -12.1 -1.	APCC CREATE APCC C	19:50 65.75 75 65.75 75 65.75 75 65.75 75 65.75 75 66.75	7.88 35.00 3.90 3.90 3.93 4.13 3.63 4.13 3.25 6.38 9.90 11.38 4.32 11.44 4.3.75 11.25 11.28 4.36 13.63	AMERICAN POWER CONVERSION DATA RACE INC. DATE RACE INC. DATA RACE
MUEL 23-50 MININY 69-38 SGI 38-78 SGI 38-78 SGI 38-78 SGI 39-78 SG	36.88 8.75 49.88 13.75 49.88 13.75 49.88 13.13 6.50 2.8.38 10.13 1.15 12	MICROS INTERNATIONAL INC. NEC AMERICA. AMDANE CORP. DATA GENERAL CORP. JOHN TO STANDAM CONTROL OF THE CORP. AMONG TO STANDAM CONTROL OF THE CORP. AMONG STYPTEMS INC. AMERICAN SOFTWARE INC. APPULS INC. ARBOR SOFTWARE INC. BOULE SEND BARBAGE BOULE SEND BARBAGE BOULE SEND BARBAGE BOULE SOFTWARE INC. COMPUNENTS CORP. FOR SOFTWARE INC. COMPUNENTS CORP. COMPUNENTS CORP. COMPUNENTS CORP. COMPUNENTS CORP. FOR SOFTWARE INC. COMPUNENTS CORP. FOR SOFTWARE INC. COMPUNENTS CORP. COMPUNENTS CORP. COMPUNENTS CORP. COMPUNENTS CORP. FOR SOFTWARE INC. LICHTURE SOFTWARE INC. COMPUNENTS CORP. COMPUNE	45.6.2.2.5.4.0.0.1.2.5.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2	3 -1.88	-3.99 -5.3 -4.9 -5.3 -4.9 -1.7 -6.6 -6.6 -6.13.1 -6.8 -6.13.1 -6.8 -6.13.1 -6.8 -6.13.1 -6.8 -6.1 -1.1 -1.1 -1.1 -1.1 -1.1 -1.1 -1.1	APCE CREATE APCE C	19:50 65.75	7.88 35.00 3.00 3.50 3.63 4.11 3.25 6.38 4.13 17.55 11.28 11.28 11.25 11	AMBERGAM POWER CONVERSION DATA RACE INC. DATE RACE INC. DATA RACE INC. WESTINE DIGITAL CORP. (H) XERON CORP. TACHOLOGY TACTORION OF THE POWER INC. DATA RACE
MUEL 23-50 MININY 69-38 SGI 38-78 SGI 38-78 SGI 38-78 SGI 39-78 SG	36.88 8.75 49.88 13.75 49.88 13.75 49.88 13.75 49.88 13.75 49.88 13.13 6.75 9.00 28.38 8.13 6.53 5.35 10.13 12.13 28.75 12.13 28.75 12.13 12.13 28.75 12.13 10.50 29.75 12.15 12.13 10.50 29.75 12.75	MICROS INTERNATIONAL INC. NEC AMERICA. AMDANE CORP. DATA GENERAL CORP. JOHN TO STANDAM CONTROL OF THE CORP. AMONG TO STANDAM CONTROL OF THE CORP. AMONG STYPTEMS INC. AMERICAN SOFTWARE INC. APPULS INC. ARBOR SOFTWARE INC. BOULE SEND BARBAGE BOULE SEND BARBAGE BOULE SEND BARBAGE BOULE SOFTWARE INC. COMPUNENTS CORP. FOR SOFTWARE INC. COMPUNENTS CORP. COMPUNENTS CORP. COMPUNENTS CORP. COMPUNENTS CORP. FOR SOFTWARE INC. COMPUNENTS CORP. FOR SOFTWARE INC. COMPUNENTS CORP. COMPUNENTS CORP. COMPUNENTS CORP. COMPUNENTS CORP. FOR SOFTWARE INC. LICHTURE SOFTWARE INC. COMPUNENTS CORP. COMPUNE	45.6.2.2.5.4.0.0.1.2.5.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2	3 -1.88	-3.99 -5.3 -4.9 -5.3 -4.9 -1.7 -6.6 -6.6 -6.13.1 -6.8 -6.13.1 -6.8 -6.13.1 -6.8 -6.13.1 -6.8 -6.1 -1.1 -1.1 -1.1 -1.1 -1.1 -1.1 -1.1	APCE CREATE APCE C	19:50 65.75	7.88 35.00 3.90 3.90 3.90 3.63 4.13 3.75 4.13 3.75 3.12 3.25 3.25 3.25 3.25 3.25 3.25 3.25 3.2	AMBERGAM POWER CONVERSION DATA RACE INC. DATE RACE INC. DATA RACE INC. WESTINE DIGITAL CORP. (H) XERON CORP. TACHOLOGY TACTORION OF THE POWER INC. DATA RACE
AMEL 23-50 MINIPY 69-38 SGI 38-78 SG	36.88 8.75 49.88 13.73 34.75 49.88 13.13 1.88 13.13 1.88 13.13 1.88 13.13 1.88 13.13 1.88 14.13 1.87 12.13 1	MICROS INTERNATIONAL INC. MICC AMERICA. AMDAHL CORP. DATA GENERAL COR	45.6.2.5.5.3.1.2.5.2.5.2.5.2.5.3.3.2.2.3.3.2.2.3.3.2.2.3.3.2.2.3.3.2.2.3.3.2.2.3.3.2.2.3.3.2.2.3.3.2.2.3.3.2.2.3.3.2.2.3.3.3.2.2.3.3.3.2.2.3.3.3.2.2.3.3.3.3.2.2.3.3.3.3.2.2.3.3.3.3.3.2.3	3 -1.88	-3.9 -3.9 -5.3 -4.9 -1.7 -4.9 -4.1 -3.1 -3.1 -3.1 -3.1 -3.1 -3.1 -3.1 -3.1 -4.1	APCE CREATE ADDRESS APCE CREATE ADDRESS ADDRES	19:50 65.75	7.88 35.00 3.50 3.50 3.50 3.50 3.50 3.50 3.5	AMBERCAN POWER CONVERSION ADAPTEC INC. AMBERCAPE, CAMBER CORP. CARRIER CENTROLOGY I TO. DAYA RACE INC. BY ARCE INC. BY ARC
MUEL 23-50 MINIPLY 69-31 MINIP	36.88 8.75 49.88 1.75 49.88 1.75 49.88 1.75 49.88 1.75 49.88 1.75 49.00 1.75	MICROS INTERNATIONAL INC. MICC AMERICA. AMDAHL CORP. DATA GENERAL COR	45.6. 45.6.	3 -1.88	-3.9 -3.9 -5.3 -4.9 -1.7 -4.9 -4.1 -3.1 -3.1 -3.1 -3.1 -3.1 -3.1 -3.1 -3.1 -4.1	APCE CREATE APCE C	19:50 65.75	7.88 35.00 3.50 3.50 3.50 3.50 3.50 3.50 3.5	AMERICAN POWER CONVERSION ADAPTEC INC. AMBEC CORP. CAMBEC CORP. CARGE CORP. CA
MUEL 23-50 MINIPLY 69-31 MINIP	36.88 8.75 49.88 1.75 49.88 1.75 49.88 1.75 49.88 1.75 49.88 1.75 49.80 2.38 13.13 1.88 38.32 5.38 1.88 28.75 4.88 28.75 4.88 28.75 4.88 28.75 1.75 4.88 28.75 1.75 4.88 28.75 1.75 4.88 14.13 11.75 4.88 14.13 11.75 4.88 14.13 11.75 15.50 12.13 11.75 15.50 12.13 12.	MICROW INTERNATIONAL INC. MICC AMERICA. MICC AMERICA. AMDAHL CORP. DATA GENERAL CORP. DATA GENERAL CORP. DATA GENERAL CORP. DIATA EQUIPMENT CORP. (L) DIATA EQUIPMENT CORP. (L) MERIDAN DATA INC. MERIDAN DATA I	45.6.2 45.6.3 4.1.1 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2	3 -1.88	-3.99 -5.3 -9.99 -5.3 -4.9 -5.1 -7 -6.0 -6.6 -10.1 -13.1 -13.9 -6.8 -6.8 -6.1 -6.1 -6.1 -6.1 -6.1 -6.1 -6.1 -6.1	APCE OF APPENDING APPENDIN	19:50 66.73 12.25	7.88 35.00 3.50 3.50 3.63 3.63 3.63 3.63 3.63 3.63 3.63 3.6	AMERICAN POWER CONVERSION ADAPTEC INC. AMBEC CORP. CAMBEC CORP. CARGE CORP. CA
MUEL 23-50 MINITY 69-38 SGI W3 70-25 MINITY 69-38 MINITY	36.88 8.75 49.88 13.13 1.88 83.13 1.88 83.13 1.88 83.13 1.88 83.13 1.88 83.13 1.88 83.13 1.88 83.13 1.88 93.12 1.13 1.88 1.12 1.13 1.88 1.12 1.13 1.88 1.12 1.13 1.88 1.12 1.13 1.88 1.12 1.13 1.88 1.12 1.13 1.88 1.12 1.13 1.88 1.12 1.13 1.88 1.12 1.13 1.88 1.12 1.13 1.88 1.12 1.13 1.88 1.12 1.13 1.88 1.12 1.13 1.88 1.12 1.13 1.88 1.12 1.13 1.88 1.12 1.13 1.12 1.12 1.12 1.12 1.12 1.12	MICROW INTERNATIONAL INC. MICC AMERICA. MICC AMERICA. AMDAHL CORP. DATA GENERAL CORP. DATA GENERAL CORP. DATA GENERAL CORP. DIATA EQUIPMENT CORP. (L) DIATA EQUIPMENT CORP. (L) MERIDAN DATA INC. MERIDAN DATA I	45.6. 45.6.	3 -1.88	-3.99 -5.3 -9.99 -5.3 -4.9 -5.1 -7 -6.0 -6.6 -10.1 -13.1 -13.9 -6.8 -6.8 -6.1 -6.1 -6.1 -6.1 -6.1 -6.1 -6.1 -6.1	APCE OF THE PROPERTY OF THE PR	19.50 fo.5.75	7.88 35.00 3.50 3.50 3.63 3.63 3.63 3.63 3.63 3.63 3.63 3.6	AMERICAN POWER CONVERSION ADAPTEC INC. AMBEC CORP. CAMBEC CORP. CARGE CORP. CA
MUEL 23-30	36.88 8.75 49.88 8.75 49.88 8.75 49.88 8.75 49.88 83.13 47.75 49.00 49.89 83.13 12.13 59.10 12.13 12.1	MICROW INTERNATIONAL INC. MICC AMERICA. AMDAHL CORP. DATA GENERAL COR	45.6.2 45.6.3 45.6.3 45.6.3 45.6.3 45.6.3 46.2 46.3 46.3 46.3 46.3 46.3 46.3 46.3 46.3	3 - 1.88	-3.9 -3.9 -5.3 -4.9 -1.7 -1.3	APCE OF APPENDING APPENDIN	19.50 fol.56.75 fol.65.75	7.88 35.00 3	AMERICAN POWER CONVERSION ADAPTEC INC. AMBEC CORP. CARBOE CORP. CONTOL CARBOE CORP. CONTOL CARBOE CORP. CONTOL CARBOE CORP. CARBOE CORP
MUEL 23-30	36.88 8.75 49.88 8.75 49.88 8.75 49.88 8.75 49.88 83.13 47.75 49.00 49.89 83.13 12.13 59.10 12.13 12.1	MICROW INTERNATIONAL INC. MICC AMERICA. AMDAHL CORP. DATA GENERAL COR	45.6.2 45.6.3 45.6.3 45.6.3 45.6.3 45.6.3 46.2 46.3 46.3 46.3 46.3 46.3 46.3 46.3 46.3	3 - 1.88	-3.99 -5.3 -9.99 -5.3 -4.9 -6.9 -6.6 -6.6 -6.3 -6.8 -6.8 -6.8 -6.8 -6.8 -6.8 -6.8 -6.8	APCE OF APPENDING APPENDIN	19.50 fol.56.75 fol.65.75	7.88 35.00 3	AMERICAN POWER CONVERSION ADAPTEC INC. AMBEC CORP. CARBOE CORP. CONTOL CARBOE CORP. CONTOL CARBOE CORP. CONTOL CARBOE CORP. CARBOE CORP
MUEL 23-30	36.88 8.75 49.88 8.75 49.88 8.75 49.88 8.75 49.88 83.13 47.75 49.00 49.88 83.13 12.13 59.10 12.13 12.1	MICROW INTERNATIONAL INC. MICC AMBRICA. MICC AMBRICA. AMDANE CORP. DATA GENERAL COR	45.6.5 (1.5.5)	3 -1.88	-3.99 -5.39 -5.39 -1.7 -1.31 -1.31 -6.6 -6.6 -6.8 -6.8 -6.8 -6.2 -1.12 -1.1 -6.0 -1.5 -1.5 -2.2 -1.5 -2.2 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2	APCE OF THE PERSON OF THE PERS	19.50 f65.75 f10.63 f65.75 f10.63 f12.25 f12.75 f10.63 f12.25 f12.75 f12.25 f12.75 f12.25 f12.75 f12.25 f12.75 f12.25 f12.75 f12.25 f12.75 f12.25 f12	7.88	AMERICAN POWER CONVERSION ADAPTEC INC. AMBEC CORP. CARBOE CORP. CONTOL CARBOE CORP. CONTOL CARBOE CORP. CONTOL CARBOE CORP. CARBOE CORP
MUEL 23-50 MIPHY 69-38 SGI W 36-25 SGI W 36-25 MIPHY 69-38 MIPHY 6	36.88 8.75 49.88 18.75 49.88 18.75 9.00 28.83 83.13 66.75 9.00 28.50 83.13 83.13 87.01 87.01 87.	MICROW INTERNATIONAL INC. MICC AMBRICA. MICC AMBRICA. AMDANE CORP. DATA GENERAL COR	45.6.2 54.0.0 9.9.3 14.2: 22.1 127.7: 12	3 - 1.88	-3.99 -9.99 -5.33 -4.99 -1.7 -1.31 -0.40 -6.6 -6.8 -5.2 -1.2.1 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1	APCE OF THE PERSON OF THE PERS	19.50 f65.75 f10.63 f65.75 f10.63 f12.25 f12.75 f10.63 f12.25 f12.75 f12.25 f12.75 f12.25 f12.75 f12.25 f12.75 f12.25 f12.75 f12.25 f12.75 f12.25 f12	7.88	AMERICAN POWER CONVERSION ADAPTEC INC. AMBEC CORP. CARBOE CORP. CONTOL CARBOE CORP. CONTOL CARBOE CORP. CONTOL CARBOE CORP. CARBOE CORP
MUEL 23-30	36.88 8.75 49.88 8.88 8.88 8.88 8.85 5.38 6.75 5.63 5.38 5.38 5.38 5.38 5.38 5.38 5.38 5.3	MICROW INTERNATIONAL INC. MICC AMBRICA. MICC AMBRICA. AMDANE CORP. DATA GENERAL COR	45.6.5 (45.6.1) (45.6	3 -1.88	-3.9 -3.9 -3.9 -5.3 -4.9 -1.7 -3.1 -6.6 -6.1 -6.1 -6.1 -6.2 -6.2 -6.2 -6.2 -6.2 -6.3 -6.3 -6.3 -6.4 -6.3 -6.4 -6.4 -6.5	APCE OF APPENDING APPENDIN	19.50 f65.75 f10.63 f65.75 f10.63 f12.25 f12.75 f10.63 f12.25 f12.75 f12.25 f12.75 f12.25 f12.75 f12.25 f12.75 f12.25 f12.75 f12.25 f12.75 f12.25 f12	7.88	AMERICAN POWER CONVERSION ADAPTEC INC. CAMBER CORP. CAMBE
MUEL 23-50 MIPHY 69-38 SUN 70-25 MIPHY 69-38 MIPHY 69-	36.88 8.75 49.88 18.75 49.88 18.75 9.00 28.83 83.13 66.75 9.00 28.50 83.13 83.13 87.01 87.01 87.	MICROW INTERNATIONAL INC. MICC AMERICA. AMDAHL CORP. DATA GENERAL COR	45.6.2 54.0.0 9.9.3 14.2: 22.1 127.7: 12	3 -1.88	-3.9 -3.9 -3.9 -3.9 -3.1	APCT CBEX.PL C	19.50 f65.75 f10.63 f65.75 f10.63 f12.25 f12.75 f10.63 f12.25 f12.75 f12.25 f12.75 f12.25 f12.75 f12.25 f12.75 f12.25 f12.75 f12.25 f12.75 f12.25 f12	7.88 35.00 31.00 3	AMERICAN POWER CONVERSION ADAPTEC INC. AMBEC CORP. CARBOE CORP. CONTOL CARBOE CORP. CONTOL CARBOE CORP. CONTOL CARBOE CORP. CARBOE CORP



"because they rock,"

technical reasons why Netscape

uses Silicon Graphics WebFORCE servers,

according to Webmaster Robert Andrews.

When you're the busiest site on the Web, when

scalability lets your Web site handle even the

you receive more than 112 million hits a

most demanding workloads. And since

day, when you download 2.8 terabytes

Silicon Graphics offers the widest range

in a single week, you need servers that you can depend on. That's why Robert Andrews,

of compatible servers, you can scale your

Web site smoothly as your on-line busi-

Netscape's Webmaster, turned to Silicon Graphics.

A FEW OTHER SITES USING WEBFORCE www.firefly.com www.discovery.com www.travelocity.com

www.travelocity.com www.bigbook.com www.warnerbros.com www.lucent.com ness grows. Technically speaking, it's the best server you can buy. And it can keep your

Web site rockin'. For

Our WebFORCE™ servers combine 64-bit MIPS®

RISC microprocessors with

the highest data throughput in the market.

Our revolutionary S2MP™ system architecture,

with industry-leading I/O, performance and

more information visit our Web site at www.sgi.com/Products/WebFORCE or call 800.636.8184 Dept. LS0054.

See what's possible







How to contact Computerworld editors

CONTACTING US BY PHONE
All editors can be contacted at our main phone number, (508) 8799700, unless otherwise noted below. Our za_hour news tip line is
(508) 820-8555. For subscriptions, call (800) 669-1002, back issues, call (508) 820-8129, mpetrins, call (508) 820-8125.
Our main facts nember is (508) 873-8931.

CONTACTING US MY E-MAIL

CONTACTING US BY E-MAIA!

Our Web address is www.computerworld.com. All of our staff
members can be reached via E-mail on the Internet using the form
firstname, lastname@ww.com. For example, News editor Patricia
Keefe is all patricia | keefe@ww.com. IDB News Service correspondents can be reached using the form firstname_lastname@idg.com.
Subscription inquiries go to riculation@cw.com.
Letters to the editor are velocome and should be sent to letters@www.com. Please include your address and telephone number.

CONTACTING US BY MAIL
Our postal address is PO Box 9171, 500 Old Connecticut Path,
Framingham, Mass. 01701

CONTACTING COMPUTERWORLD EDITORS

We invite our readers to call or write with comments and ideas. It is best to submit ideas to one of the department editors as well as to the appropriate beat reporter.

Editor Paul Gillin (508) 620-7724
Exacutive Editor Maryfran Johnson (508) 820-8179

Patricia Keefe (508) 820-8183
Sections Editor
Sections Editor
Sections Editor
Tisections Editor
Online Editor
Johann Ambrosio (508) 820-853
Milch Betts (202) 347-6718

SENIOR EDITORS/NEWS

CIMI Cisco Citize Coge Syste Comp

Composition Composition Composition Composition Composition Core

Cour Cove Craft Cybe Cypr Data Data Servi Data Dedi Deer Dell' Dialo Digit

Dona

Gary H. Anthes (202) 347-0134 Laura DiDio (508) 820-8182 Patrick Dryden (817) 924-5485 Thomas Hoffman (201) 587-0090 Julia King (610) 532-7599

SENIOR WRITERS/NEWS

OPINIONS/VIEWPOINT

Technical Editor Charles Babcock (415) 546-5512
Viewpoint Editor Mitch Berts (202) 347-6718
Staff Celumnist Frank Heyes (503) 252-0100

DEPARTMENT EDITORS/FEATURES

ASSOCIATE EDITORS/FEATURES

Managing Rick Sala (508) 820-8118

COPY DESK

Ellen Fanning, managing editor (508) 820-8274; Roberta Fusaro, assistant managing editor; Christina Alizardi Maguire, senior prague editor; Michelle Davidson, Kimberty Gilllard, senior production copy editors; Isamie Eckle, Pat Hyde, David Ramel, Jeremy Selwyn, copy editors; Imania Sambataro,

GRAPHIC DESIGN

ADMINISTRATIVE SUPPORT

COMPUTERWORLD MAGAZINES GROUP

(Includes Premier soo, Campus Edillien, Beer Places to Work, Leadership Series, Intanet Series, Clent/Server Journal, Eschrook: Commerce Journal and vertical industry personals.

Alan Alper, editor (5,60) 820-815; Many Strandel, excited editor, Anne McCrooy, Cathrien McCrooy, Cathr

IDG News Service Correspondents

Strategy Technology

Companies in this issue

Page number refers to page on which story begins. Company names can also be searched at www.computerworld.com.

Acclaim
Communications, Inc 59
Adobe Systems, Inc81
Advanced RISC Machines Ltd41
AG Communication Systems 10
Alamo Rent A Car, Inc
All Business Network81
Amacom 75
America Online, Inc 12,129
American Orthopedic
Appliance Group99
Anthro Co 99
Apple Computer, Inc 1.14.41.61
Arbor Software Corp 46,121
Articoft Inc
Artisoft, Inc
Ascend Communications, Inc 2
AT&T Corp 2
Atex, Inc61 Autologic Information
International, Inc 44
Aux Technology, Inc
Backlov 90
Bain Capital, Inc16
BankBoston Corp15
Banyan Systems, Inc 92
Baxter Healthcare Corp 53
Bay Networks, Inc 1,24,114
BC Hydro and
Power Authority61
Best Software, Inc 8
Bilbo Innovations, Inc 99
Blockbuster
Entertainment Group 45
Blue Cross/Blue
Shield Association10
BMC Software, Inc 2
Borland
International, Inc 45.46
Brewers Retail. Inc 1.12
Brio Technology, Inc 121
Burlington Coat
Factory Warehouse Corp 16
Business Information
Systems, Inc31
C H Products
Cabletron Systems, Inc 1,53,114
Calvert Group31
Cambridge Technology
Partners, Inc 69
Carson Group41
Cascade41
Cascang
Communications Corp 53 Case Logic 98

Technology	Eli Lilly & Co
sulting, Inc 6	EMC Corp 43
link Direct, Inc 2	Entergy Services, Inc 53
les Schwab & Co 4	Enterprise Productivity
e Ergonomics, Inc 98,99	Systems, Inc 45
nical Bank 45	Ergonomic Logic, Inc
com Corp1	EuroPages8
sler Corp1	Farallon
b & Son, Inc 1	Communications, Inc
Corp 24	Federal Express Corp 78
Systems, Inc 1,24,53,114	Fellowes Computerware 91
ens Gas & Coke 74	Fenwick Partners10
ent Information	Fine Designs
ems, Inc 89	First Albany Corp 12
paq Computer Corp 2,12	Forrester Research, Inc 6.1
15,20,85	14.6
puServe, Inc 12,129	Ganymede Software, Inc 5
puter Associates	Gartner Group, Inc 1,12,44,4
mational, Inc	Geac Computer Corp10
puter Systems	General Motors Corp 5
ty Project1	Genesys Software
puterworld, Inc 6	Systems, Inc
	Giga Information Group 2
Corp41,46	Girsberger Industries 9
ntrywide Home Loans, Inc61	
ey Leadership Center 74	GlareGuard13
Enterprises, Inc16	Global Marine, Inc
er Promotions, Inc12	GolfWeb, Inc
ress Semiconductor Corp31	Greenbrier & Russel10
as Semiconductor130	Gruener & Jahr
apro Information	USA Publishing1
rices Group, Inc69	Grumman Data Systems 7
aquest41	GTE Corp 8,45,4
uctive Corp45	GTE Data Services 8,45,4
r Valley Lodging Co 69	Hewlett-Packard Co 10,1
'Oro Group 114	28,43,13
og Information Systems 75	Honeywell13
tal Equipment Corp4,12	Hurwitz Group, Inc 4
15,28	IBM1,2,8,28,4
aldson, Lufkin III	53,58,61,69,114,12
ette Securities Corp 28	Illuminata, Inc 4
Chemical Co1	Infonetics Research, Inc 5
ob Works102	Information Access Co 6
■ Bradstreet Software 16	Informix Software, Inc 2,45,4
lop Tire Co 6	Integrated Micro Solutions 6
rand D. Jones & Co. 6	Intel Corn 1.8

	Internet Architecture Board 14
1	Internet Society14
	ITT Corp 69
	John Deere & Co
	Kantek, Inc 99
)	Kantek, Inc
	Kraft Foods74
	Langsfeld Fazio & Associates 69
	Legato Systems, Inc 58
3	Liberty Mutual Group15
3	Liberty Travel, Inc 8
3	Lockheed Martin Corp 6
	Lotus Development Corp 46,61
ı	Lucent Technologies, Inc 55
3 3 3 5	Madge Networks, Inc 1,114
1	Matrix Resources, Inc102
3	Matrixx Marketing, Inc61
3	Mercury Research 20
	Meta Group, Inc 16,69
3	Microsoft Corp 1,2,8,15,16,41,43
	45,46,48,61,64,71,102,127,129
4	MindSpring Enterprises, Inc 6
0	Mitsubishi Chemical
9	America, Inc12
5	Monorail, Inc 20
	Monsanto Co 53
4 2	Morgan Stanley & Co 121
2	Motorola, Inc55
	MouseMitt International 99
6	MTV
5	
6	NationsBank Corp 78
2	Netcom On-Line
	Communication Services, Inc 6
1	NetLink, Inc 53 Netscape Communications
6	Corp 1,53,61,64,85
5	Netstart, Inc
	Network Solutions, Inc
4	New Dimension Software 55
3	
4	Novell, Inc
	Octopus Technologies, Inc 43
4 5 2	
5	Olicom USA, Inc 114 Onstream Networks, Inc 53
2	
8	Open Systems Advisors61

•	
	Open Universal Software, Inc71
	Optimal Networks Corp 2
	Oracle Corp 2,6,8,16,45,46,121
	Ouellette & Associates
	Consulting, Inc 74
	Pacific Bell6s
	Partners HealthCare System 12
	Patricia Seybold Group 62
	PcOrder.com
	Pennzoil Co 53
	Perot Systems Corp 78
	Philips Flectronics
	North America Corp12
	Plaintree Systems, Inc
	Platinum Technology, Inc 59
	Positive Support
	Review, Inc
	Power Computing Corp14
	Power Conversion
	Products, Inc31
	Powersoft Corp 1,4,16
	PRC, Inc 43
	Premiere Resorts
	International 69
	Prism Solutions, Inc 121
	Pro-Mation, Inc16
	PSinet, Inc. 6,14 R. H. Donnelley & Sons 1,2,45 Ricoh Corp. 12
	R. M. Donnettey & Sons1,2,45
	Ricon Corp12 Rockwell International Corp 55
	Rogue Wave Software, Inc 45
	Rohm and Haas129
	Sanofi Diagnostics
	Pasteur, Inc 8
	Seagate Software, Inc
	Seek Consulting Group10
	Silverweave, Inc61
	Site Technologies, Inc
	Smith & Nephew Roylan, Inc 98
	Smith Barney 2
	Solutionsoft
	Sony Electronics, Inc12
	Springer-Miller Systems, Inc 69
	Spyglass, Inc
	Sterling Software, Inc
	Storage Technology Corp 58
	StrataCom, Inc
	CCH annual annual annual at 3.3

resources 45
Summit Strategies, Inc12
Summit Strategies, Inc 12 Sun Microsystems, Inc 8,12,16
SunSoft, Inc
Sybase, Inc 1,2,8,16,45,46
Symantec Corp 45
Sync Research, Inc55
Systron Inc 62 CE
Systron Inc
Candem Computers Inc 1
Tech-Teach
nternational, Inc 53,55 Technology Business
Research, Inc12
TeleChoice. Inc 55
Felelink Corp 55 Fexas Instruments, Inc 53
Texas Instruments, Inc
The Bennett Co 12
The Coca-Cola Co 6
The Dun &
Bradstreet Corp 14,16
The Focus Group
The Linksys Group, Inc 59
The Merrick Printing Co 53
The New York Times
Electronic Media Co61.62
The Tolly Group 114
The Tolly Group 114 The Wall Street Journal 75,78
The Yankee Group 1,61
Tivoli Systems, Inc
Towers Perrin, Inc 8
TransQuest, Inc 4
Tribune Media Services 78
Turner Broadcasting
System, Inc6
TyLink Corp 55
U.S. Robotics Corp 55,89
UB Networks, Inc.
United Auto Parts7: United Healthcare Corp
United Healthcare Corp 74
USAA Property and
Casualty Insurance Group 129
Vality Technology, Inc 12:
Van Ören 99
Virtual IO 99
Vision Quest5
Visual Components
Warren Suss Associates 30
Wisco 98 Workgroup Strategic
Workgroup Strategic
Services, Inc
Property Organization1
Property Organization1
Xylan Corp 11

INFS for Windows NT 4.0

Today!



Microsoft tools link Web apps to corporate databases

By Mitch Wagner and Kim S. Nash

Microsoft Corp. this week plans to unveil tools to link World Wide Web applications to corporate databases as well as a new proxy server and a new version of its Web server.

Also at the Microsoft Site Builder Conference in San Jose, Calif., the company will announce Internet Studio. The application development tools were designed to build Web applications that access data stored in corporate databas-

es using Open Database Connectivity interfaces. Also included will be support for ActiveX controls to build client-side programs for accessing data on the Web, according to sources briefed by Microsoft.

Internet Studio will be available by the first quarter of next year.

A new version of Internet Information Server will enter beta testing today and will be available by the first quarter of next year, said Tanya van Dam, a group product manager at Microsoft in Redmond, Wash. The software

will include capabilities, codenamed Denali, that were designed to let users embed serverside scripts, ActiveX and Component Object Model objects on Web pages.

In an announcement not related to the show, Microsoft plans to ship a server to help information systems managers control enduser access to the Internet.

Proxy server

The \$995 Proxy Server works with non-TCP/IP networks such as IPX. It is integrated with Win-

they're going to do

it," said Pompi Ma-

lik, an information

systems manager at Brewers Retail, Inc.,

a large beer distribu-

tor in Mississauga,

Sources at Micro-

soft said the compa-

ny plans to quell

those concerns and

quash criticism of its

strategy

dows NT Directory Services to combine user access permissions and security settings on the Internet gateway with existing NT Servers. The product also automatically caches Web pages, which can speed up Web surfing.

Users can download Proxy Server for a free 60-day trial period from Microsoft's Web site (www.microsoft.com).

And Microsoft will outline plans for a new, low-cost personal computer, to compete with network computers, The Wall Street Journal reported Friday. Unlike network computer proposals from Oracle Corp. and Sun Microsystems, Inc., the Microsoft proposal will run on Intel Corp. processors and use Microsoft operating systems.

Supporters of Microsoft's proposal will include Hewlett-Packard Co., Compaq Computer Corp, Dell Computer Corp. and other PC makers, according to the lowral.

Microsoft officials said the fournal report is accurate but incomplete.

OS road map

CONTINUED FROM PAGE 1

it plans to have one common operating system kernel. But the company has been noticeably mum about exactly when and how it will accomplish that.

Users and analysts said they are eager for actual product demonstrations and pre-alpha copies of the software, some of which also will be announced at the Microsoft Site Builder Conference this week (see story above).

Michael Gartenberg, an analyst at Gartner Group, Inc. in Stamford, Conn., said Microsoft has been remiss in not presenting a definitive picture regarding the future of its two desktop operating systems.

Gartenberg said although there is currently no real migra-

"The reality

is that the

migration

path is a

nightmare."

-Pompi Malik

Brewers Retail

tion path to take users from Windows 95 to Windows NT 4.0, he expects Microsoft to develop a good path between Windows 95/97 and Windows NT 5.0, code-named Cairo. "If Microsoft didn't, there would be a revolution. NT 5.0

will not ship unless there's a path.

And once there's a path, you won't go back," he said.

Representatives at seven Fortune 500 firms interviewed by Computerworld, including Monsanto Co., Lockheed Martin Corp. and Kaiser Permanente Health Plan, Inc., agreed.

"I say hip, hip, hooray to a single operating system kernel - Windows NT even if there's pain involved in getting there," said Tom Boos, senior vice president of information technology services and development at the Coris division of R. R. Donnelley & Sons Publishing Corp. in Chicago, "I want consistency. Right now, the variations among Windows

3.1, Windows 95, Windows NT and the IBM OS/2 Warp platforms are driving us nuts," he

Boos said many of his end users — and R. R. Donnelley's network administrators and internal software engineers — worry about what will happen if Microsoft gets rid of Windows 95 in fa-

> vor of Windows NT Workstation.

"it's crucial for Microsoft to protect the upgradability of the applications I develop and ensure backward and forward compatibility," Boos said. "No one wants to spend exorbitant amounts of

money buying all new Microsoft OS licenses. That's one reason a lot of users — us included — want to hang on to our 16-bit apps."

Interoperability is another big

"Windows NT and Windows 97 may look the same externally, but the kernels are different. The reality is that the migration path is a nightmare. I don't know how



R. R. Donnelley's Tom Boos: 'I say hip, hip, horray to a single operating system kernel'

with a raft of demonstrations and briefings at its conference next week. Attendees will receive pre-alpha versions of some key software packages, including the Slate systems administration utility, sources close to Microsoft said

Internet

Ontario.

Other highlights will include the following:

• A beta version of Internet Information Server 3.0, which will contain support for ActiveX Server pages. This will make it easier for third-party developers to create dynamic World Wide Web applications using Microsoft's Visual Basic and Java scripts.

A preview of Microsoft's implementation of the Java Virtual Machine, which will let businesses run Java applications on Windows NT Server.

 A demonstration of Microsoft's transaction server, code-named Viper, which was designed to simplify development of integrated Windows NT Server and Internet applications.

 A demonstration of Cedar, the code name for an upcoming SNA Server software technology that will let users access mainframe transactions via Microsoft's Internet Explorer.

Intranets trip on client/server

CONTINUED FROM PAGE 1

for the following reasons:

 There is too much application logic on the client side.

Platform-specific coding isn't easily translated.

 Client/server tools vendors lag in adding web features to their products.

Moreover, the model that made client/server appealing — moving chunks of application logic from big mainframes to desktops and using smaller, cheaper server machines — doesn't cut it in an intranet world, several users said.

Scrapping fat clients

When John Deere & Co.'s applica Engine Works division in Waterloo, Iowa, replaced applications with intranets, most client/

server systems "with fat clients had to be scrapped," said Phyllis Michaelides, head of the division's technology architecture team, at a recent seminar.

For example, a shop floor application built with Apple Computer, Inc. Macintosh Hypercard tools had to be rewritten, Michaelides said. "There's no salvaging those with heavy front ends," she said.

Although not all client/server applications will be replaced out of hand, none of the mainframe programs at the Engine Works division must be heavily modified, she said.

The Texas Comptroller of Public Accounts recently learned a similar lesson. The agency scaled back plans to move a state system from IBM mainframes to a client/server setup using PowerBuilder, Sybase, Inc. databases and RS/6000 Unix boxes

"That was the recommended architecture proposed by Gartner Group, but it turns out that we have too much data," said Stuart Greenfield, a software analyst at the agency in Austin, Texas. "Using a browser-type front end for the mainframe is going to be a lot easier."

Chubb & Son, Inc., an insurer in Warren, N.J., is testing a handful of web-based terminal emulation products that let browser users access IBM DB2 and IMS databases on mainframes.

The company's client/server applications, though, are largely

separate from its intranets. That is because "it's not clear to us at all how to bring them

together," said David Belsky, a senior technical analyst at Chubb.

"People here are starting to say, 'Maybe the ultimate web server is the MVS host,'" Belsky said.

"With older host-terminal apps, it's just an interface you have to write," said Jay Vander Wall, a technical architect at Dow Chemical Co. in Midland, Mich.

Also blocking client/server's way onto intranets are programs that were built for a particular operating system, said Rick Villars, an analyst at International Data Corp. in Framingham, Mass. "You see a lot of quirks in the code particular to a certain platform that may or may not work in a browser," he explained.

Profession postage and of Tempingum, Mass,, and additional smalling efforce. Postage drawler Casa-Balls international Paulis, and agreement displayed, composition control (SSS) to our all public or development of the professional professio











Pure and Atria have merged

No, the world hasn't changed.

Parking tickets haven't disappeared.

Airline food hasn't been improved.

The opposite sex isn't any easier to understand.

But the combination of our software diagnostic products,

software development enterprise products,

and application testing products

has created an Automated Software Quality solution

that will help your team work together more effectively.

Which means you'll be able to build better software.

We've merged.

On second thought, maybe the world has changed just a little.



THE FOUNDATION FOR BETTER SOFTWARE

To find out more, visit our web site - www.pureatria.com

© Pure Atria Corp. Our products include Purify, Quantify, PureCoverage, ClearCase, ClearCase MultiSite, ClearGuide, PureDDTS, PureTestExpert and PurePerformix.

We can also be reached by calling (800) 353-7873.

David Coursey

New season for The Microsoft Network

ith the relaunch of its online service, Microsoft is doing it again. The company is raising the ante, forcing competitors such as America Online, the crumbling CompuServe and hundreds of World Wide Web sites to improve what they're doing if they want to stay in the game. And as has often been the case, Microsoft is doing this from a position of relative weakness.

It's hard for outsiders to think of Microsoft as an underdog, but its big successes (DOS, Word, Excel, Office and NT) have come in markets in which the company started out well behind entrenched competitors.

If history is our guide, The Microsoft Network (MSN) is about to become a big success. Even with its 1.6 million members, the new MSN is being launched from a position well behind AOL and CompuServe.

If it's successful, MSN will have a subtle but perceptible effect on everything online, just as the influence of MTV has spread across broadcast, cable and even corporate television. Not to mention what MTV has done to popular culture.

The TV comparison is apt because the new MSN isn't so much an online service as an online network. MSN brings TV concepts — including shows, seasons and cancellations — to the online world.

Online flash

It's a "hits business," according to the service's executive producer, who promises midseason replacements if the shows don't draw enough ratings. And just like TV, the service tends more toward style than substance — start digging down in MSN, and you'll quickly come out the other side.

So how does all this work? To access MSN, you'll use a special version of Microsoft's Internet Explorer called the Program Viewer, which uses 30M to 50M bytes of ActiveX controls.

Microsoft has essentially plopped a

new proprietary network onto the Internet. Sure, it uses TCP/IP and provides access to Web sites and other 'net resources, but without the special browser, you're toast.

The special browser, with its extra buttons and black-and-silver user inter-

face, lets you visit MSN's new On Stage section. This is where six channels of "Web shows" live, each demographically programmed to attract members of our society's ruling class and their children. Across the six channels are about 20 Web shows, including dramas, comedies, travel, history and news.

The individual shows (not including MSNBC) cost from \$100,000 to \$1 million per 13-week season to produce; the higher-priced shows have big start-up

costs that jack up the first-season price. To my knowledge, AOL doesn't have anything to compete on a dollar-fordollar basis.

But AOL will, and someday you may as well. If the new MSN is a hit (and re-

member, Microsoft is spending \$100 million to promote the launch and isn't predicting profits for three years), it will change your users' perceptions of the Internet and your corporate intranet.

Will your company's human resources site turn in-

to a daily drama? Probably not, even though most HR departments seem pretty much like a soap opera to me. But in bringing a TV metaphor and sensibility to the online world, the new MSN will certainly shake things up — for the better.

Coursey, an analyst and consultant, is editor of "coursey.com," an online newsletter available at www.coursey.com. His new life goal is to become the Ed Sullivan of the MSN.

Charles Babcock

Inside the Kingdom, the subjects speak

ore than 5,000 IT types gathered at Disney World in Lake Buena Vista, Fla., recently to hear Gartner Group analysts talk about trends in IS management. But often the attendees' talk in the hallways, around the tables in the luncheon tent and by the steaming coffee urns was more enlightening.

In such a crowd, it wasn't easy for acquaintances to find one another. "Where are you staying?" one would ask. When the hotel was named, the follow-up query would be, "Is that inside the Kingdom?" referring to the sprawling Disney grounds sometimes known as the Magic Kingdom.

William S. Hutton is a vice president of claims process re-engineering at USAA Property and Casualty Insurance Group. (I didn't know there were vice presidents for re-engineering.) He said something that sounded as prophetic as anything uttered by an analyst. After standing in line to get lunch, he said:

"From gatherings like this, it's clear that most American business underestimates the size of the economy. IT will take up an increasing share of the budget because of its close relationship with future growth. The companies that don't invest will lose the business."

Invest aggressively in IS or lose your future customers?

In an era marked by cost containment, downsizing and skepticism of IS, Hutton struck a heretical but realistic note. The right thing to do, he said, was to spend now in hopes that you won't be left behind in the future.

Donald Hirst, vice president for network services architecture at the Chicago office of Dutch banking giant ABN-AMRO Services, was diligently filling out a speaker evaluation form after a session on security when I interrupted him. What did he think after hearing the speaker's warnings?

"Right now, we have lots of dial-in modems, access from outside the firewall. But we also have a very active program to put in secure remote access through a third-barty brovider." he said. "Users dial

up the third party, who gives them access over secure lines. We're removing the direct dial-in capability [as a security risk]. Our strategic direction is to move [10,000 users] over to Windows NT as fast as possible because of the greater desktop security.

Mikaele Racine, a client/server technical support manager at chemicals maker Rohm and Haas in Philadelphia, helps maintain the information that goes into directories for Novell's Net-Ware, Lotus Notes, CC:Mail, the corporate telephone book and human resources.

"We would like to put all this information in one directory, or at least have the different directories talk to each other. We want to move toward an X.500 directory and LDAP." he said.

A large, bulky X.500 directory can function as a universal directory across applications. Lightweight Directory Access Protocol (LDAP) is a directory specification small enough to sit on a cli-

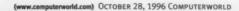
ent and make the connection to the corporate direc-

The year 2000 problem received its share of attention. Said Mary Ellen Dobbins, assistant director of the Justice Data Center at the Florida Supreme Court in Tallahassee, who start-

ed her career as a Cobol programmer:

"We never dreamed we'd be around when the year 2000 came. We thought the code we were writing in the 1970s would be replaced in 10 years. It's still around, and so are we."

Babcock is Computerworld's technical editor. His Internet address is charles_babcock@



alcw

Touch of a button

Cybershoppers may soon have an "electronic wallet" that lets them make online purchases with peace of mind. Dallas Semiconductor (www.ibutton.com) has developed a wallet that features the Cryptographic IButton, a special-

ized computer chip encased in a stainless steel button. The button acts like a smart card and holds the user's

financial data in encrypted form.
Users touch the button to the Dot
Receptor computer interface to
conduct secure transactions.
A small change-purse version is
already deployed in China, Brazil,

Argentina, Canada and Turkey.

Transit riders in Istanbul quickly pay fares by touching the IButton to a Dot Receptor as they go through the turnstiles.

Security features of the IButton include a high-speed random-number generator for public-key encryption, a large key size of 1,024 bits and an internal time clock to time-stamp transactions. Furthermore, any effort to open or tamper with the steel button immediately erases the chip's memory.



High-quality glare filters, such as this model from GlareGuard in Santa Rosa, Calif, can reduce eye strain and headaches, a new study confirms (see story below). The glare filters cost between \$20 and \$70.

Human Factors

rgonomics expert Alan Hedge is usually a skeptic about ergo-gadgets that claim to help people who suffer from wrist injuries and eye strain because of computer work.

But Hedge, who is professor of human factors at Cornell University in Ithaca, N.Y., said high-quality filters that cut screen glare really reduced the "tired eyes" and headache complaints of computer users. "This was a complete surprise. A glare filter works for most sufferers," he said at an ergonomics conference in Philadelphia.

Hedge and other researchers conducted a rigorous study of 171 full-time computer users at Honeywell in Phoenix. Bothersome screen glare was reported by three-quarters of the workers, but that dropped to less than one-third of the workers after high-quality glass filters were installed.

Furthermore, 81% of the users said the filter made the screen easier to read, and 73% said screen text was clearer. There was one complaint: The glare filters make the screen darker. — Mitch Betts



item is used, we'll send you a wicked cool T-shirt

Waiting downloads

The Web has already benefited mankind by producing "bonus" increments of time – those precious moments spent waiting for Web pages and graphics to fill the screen. The Washington Post's Fast

Forward magazine recently asked readers what they do with their online downtime and got the following responses:

- Study tax law. (This was Washington, after all.)
- Floss my teeth, but that tended to make splatter marks on the monitor.
- Do laundry (load, add fabric softener and fold).
- The operative words are "picking" and "nose."
- Clean my keyboard with 409 and Q-Tips.
- Doodle with Crayola crayons (the 64-color box).
- Stare at the screen, using my brain at full psychokinetic strength to "will" the image to appear.

Here at alt.cw, we use the time to discard press releases and send faxes. What do you do while Web-waiting? Send your stories to mbetts@cw.com.

Inside Lines

Cold Warrior plays Microsoft's game

Microsoft has hired one of the most notorious information warriors of the Cold War, an ex-Soviet operative responsible for sapping millions of staff-years of productivty from U.S. knowledge workers: Alexey Pajitnov, the inventor of Tetris. Pajitnov will work in Microsoft's games unit. Hopefully the unit will ship his products only to Iraq and other countries we don't like, so they, not us, can spend endless hours staring at the screen.

Execs verklempt for Dole/Kemp

Fed up with what they see as a pro-Clinton bias from the national press, a group of some 243 Silicon Valley executives this week plans to release an open letter trumpeting their support for the Dole/Kemp ticket (see @Computerworld, www.computerworld.com, for related story). The Silicon Valley revolt is a turnaround from 1992.

Michigan cops stung by break-in

A program intended to help police departments keep track of case records "eats up" data over time, according to an officer in Michigan, where about 25 departments use the tool. One department reportedly lost about four years' worth of data. The software was created by a local developer who is now the subject of a manhunt.

Not with my daughtURL, you don't

The back cover of Going to the Net: A Girl's Guide to Cyberspace (Avon Books, New York) lists lots of reasons young grrls with URLs ought to buy this new book: games, education, research, shopping, fitness. But what are we to make of this one? "Make new friends (zillions of boys are on the net!)." Just remember, girls — on the Internet, no one knows you're a sleaze.

Strengthening the wall

Optimal Networks this week will detail plans for a package that will fortify security firewalls. Optimal's Windowsbased Internet Monitor logs addresses of outside users who gain network access. After determining which users are unauthorized, Internet Monitor sends those addresses to firewalls from Ascend Communications, which block network access to those parties. Internet Monitor costs \$1,500 and will be available in the first quarter.

JavaSoft won't be snubbed

Microsoft thumbed its nose at JavaSoft but may realize that it doesn't pay to spit in the wind. Microsoft is holding its Professional Developers Conference in Long Beach, Calif., next week. JavaSoft wanted in on the fun, but Microsoft refused. It's their party, and they'll have no crashers. Not to be snubbed so easily, JavaSoft is staging its own developers conference — across the street.

Year 2000 gallows humor

The looming date-change crisis of the year 2000 is no laughing matter. But Giga Group analyst David Gilmour managed to get some genuine guffaws last week at the Technology Forum '96 Conference in New York, where he told a room full of IS execs: "On New Year's Eve 1999, you'll all be in your network control centers with your resume in one hand and a beeper in the other!"

Here are some new voice-mail options we heard recently. "If you are a psychotic hiller, put down the knife and press one. . . . For Oedipus complexes, have your mother help you press two. . . . For paranoia, make sure no one's watching, then press three. . . . And for codependency, press four — if it's OK with everyone else." We'd love to get voice mail from you. Just dial up news editor Patricia Keefe at (508) 820-8183. Or E-mail her at patricia Keefe@cw.com.



MICHON

HOW CAN SOMETHING SO FAST HANDLE SO WE

It's In The Steering.

Portable computing moves into the fast lane with two exclusive features from Micron Electronics. The Pick-a-Point** dual pointing device gives you a choice of controls touchpad or pointing stick. The FlexOpt™ dual-bay modular design lets you mix and match devices for a variety of customized performance-enhancing choices. You can drop in a modular CD-ROM drive for multimedia capability, add a second intelligent lithium-ion battery for up to 8 hours use without recharging, or add a 2.1GB hard

drive to increase your storage capacity. The Millennia TransPort™ even has an infrared port for walkup and wireless printing from compatible printers. And don't forget the industry-leading Micron Power™ warranty. Drivers, start your engines! "Michael Justiery performance will stery deprending on organizations, and configurations. Bissed on two 4



STANDARD FEATURES

- · Mobile Intel Pentiumo processor
- Intel 430MX PCI chipset
- 256KB L2 pipeline burst cache
- 8X modular CD-ROM drive
- . PCI graphics accelerator, 1MB EDO RAM
- Pick-a-Point™ dual pointing devices integrate both pointing stick and touchpad
- · Removable EIDE hard drive
- 3.5" modular floppy drive
- · Intelligent modular lithium-ion battery
- · 16-bit stereo sound
- · Built-in stereo speakers and microphone

- 2 Type II or one Type III PCMCIA slots
- · S-video and NTSC-video outputs
- · Headphone, microphone and line-in jacks
- · 2 infrared ports, one front, one back
- · Parallel, serial, VGA and 2 PS/2 ports
- Dimensions: 11.7" x 9.4" x 2.0", 6.9 lbs.†
- · Nylon carrying case
- Microsoft® Windows® 95 and MS® Plus! CD
- · Microsoft Office Pro 95 and Bookshelf 95 CDs
- Kensington security lock ready‡
- # 5-year/3-year Micron Power- warranty

†6.9 lbs. includes 3.5" flappy and one battery *Lock sacures both Millennia TransPort and Mi



pentium



Microsoft

- 133MHz mobile Intel Pentium processor
- 16MB EDO RAM (48MB max.) • 12.1" artive matrix color display, 800 x 600
- 1.3GB removable hard drive
- 133MHz mobile Intel Pentium processor
- 32MB EDO RAM (48MB max.)
- Motorola
 Montana 28.8 fax/modem
- 12.1" active matrix color display, 800 x 600 • 1.3GB removable hard drive
- · 7wl lithium-ion botten
- 150MHz mobile Intel Pentium processor
- 32MB EDO RAM (48MB max.)
- Motorola Montana 28.8 fax/modem
 12.1" active matrix color display, 800 x 600
- 2.1GB removable hard drive
- 2nd lithium-ion battery

- With 150MHz mobile Intel Festium genoresur ...sid 1/2/30
 With 154MB DMMA medule upgrade ...odd 1/349
 With 32MB DMMA module upgrade ...odd 1/749
- · With 2nd lithin
- Will 3Com« ethernet 108T PCMCIA With Microsofts Minimum. 2 M. B fax/mo
 With Microsofts multimedia post res

Micron Power Warranty & Support

√ 1-, 2-or 3 year optional on-site service agrees

√ 30 days of free Microe-supplied software supp

√ 30 days of free Microe-supp

http://www.mei.micron.com

900 E. Karchar Bood, Hompe, 10 ISSAET + Mon-Fri Journ Flyon Set Zeun-Sym (AII) = Internetional Solas Hoo Alan-Fri Journ (AII) = 2018 FRI 2018 of faz 2018 FRI 2-272 = Perclama Order Faz 2018 FRI 2-872 Beland Support Arciloble 24 Hows A Day—7 Days A Whok = Nachakad Support E-mail: tocksupport.maicromics

208-973-970 208-973-7373 8-8 95-900-706-1755 E 18the loan Paris No. 9-8 killine loan Card 208-973-973 208-973-975

Did you get my document?

Yeah, I made a few changes.

NTRODUCING NETWORKS WITHOUT LIMITS. MADE POSSIBLE BY WINDOWS NT WORKSTATION AND KINGSTON MEMORY.



If you want to take your network and business to a higher level, you need Microsoft® Windows NT® Workstation. Of course,

an operating system that powerful should be fueled only by the finest memory: Kingston. You'll see productivity go through the roof. People will be downloading

vital information from the Internet. Running multiple 32-bit applications at light speed. And sending messages and images back and forth across the planet. So, why Kingston memory? Kingston engineers use exactly the same specifications as system manu-

facturers, like DEC," Compag, HP, and IBM. And they test every cell on every chip on every module. (On a 16 megabyte module, that's 128 million cells.) Besides, Kingston memory costs far less than the system manufacturers.' To find

out more, call (800) 588-5359 today. And watch your network really take off.



For more information call us at (800) 588-5359 (180)



Kingston MEMORY

Visit our Web site: http://www.kingston.com/cw.htm

Kingston Technology Corporation, 17600 Newhope Street, Fountain Valley, CA 92708 USA, (714) 435-2600, Fax (714) 435-2699. © 1996 Kingston Technology Corporation. All rights reserved. Kingston memory is compatible with Windows NT Workstation. Kingston is a registered trademark and Computing Without Limits is a trademark of Kingston Technology Corporation. Microsoft and Windows NT are registered trademarks of Microsoft Corporation. All other trademarks are the property of their respective owners.

